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AUTOMOTIVE INDUSTRIES

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April 4, 1936

Barit and Black On A.M.A. Board

Hudson President Replaces Chapin and Black of White Takes Place of T. R. Dahl

A. Edward Barit, president of Hudson Motor Car Co., has been elected a director of the Automobile Manufacturers Association, to fill the vacancy caused by the death of Roy D. Chapin, who was a charter member of the manufacturers' organization when it was formed in 1913 as the National Automobile Chamber of Commerce.

Robert F. Black, president of The White Motor Co., was elected to fill the vacancy caused by the resignation of T. R. Dahl. Mr. Black was with the Mack Truck organization in Chicago and last year resigned from the presidency of Brockway Motor Truck Co. to head The White Motor Co.

Other members of the board of directors are: A. J. Brosseau, Walter P. Chrysler, Byron C. Foy, Robert C. Graham, Paul G. Hoffman, Alvan Macauley, W. F. McAfee, Charles W. Nash, Alfred P. Sloan, Jr., and Alfred H. Swayne.

N.A.D.A. Executives Plan Future Along Sound Lines

The executive committee of the National Automobile Dealers Association which convened in St. Louis Wednesday had reached no decision up to press time Thursday with respect to the vacancy created by the death of Jack Frost, who was executive vice-president.

The committee believes that the affairs of the association have passed the crossroads and from now on the association's position will show steady improvements. The executive group, in laying plans for the future, aims to have them follow sound lines and to be directed at attainable objectives so that extravagant anticipations will not be raised among dealers.

M. E. Peters, assistant general manager of the N.A.D.A., has resigned.

Knudsen Says Broad Recovery To Continue at Least 2 Years

General Motors Corp. expects to turn out nearly 25,000 more cars and trucks in the second quarter than in the first three months this year, and output for the first six months of 1936 should reach 928,000 units, according to W. S. Knudsen, executive vice-president.

(*Turn to page 495, please*)

This Week

"Down the Assembly Lines at Plymouth"

with

JOSEPH GESCHELIN

Detroit Technical Editor
AUTOMOTIVE INDUSTRIES

A real contribution to the literature of automotive manufacturing—Inaugurating a monthly series of articles on the modern plants of the automotive industry—in the first issue of each month

See Page 498

Double, Double

Coordinator for Industry Turns Left Hand to Politics

Although still occupying the position of industry coordinator, Major George L. Berry announced on Wednesday the formation of a labor party to be known as Labor's Non-partisan League with the express purpose of bringing about the reelection of President Roosevelt. The move is heralded as the most definite development yet taken in the campaign which draws a sharp line of demarcation politically between industry and labor, precisely the thing Major Berry, as industry coordinator, announced he was urgently seeking to avoid.

John L. Lewis, head of the United Mine Workers of America and chairman of the Industrial Union Committee, and Sidney Hillman, head of the Amalgamated Clothing Workers' Union, are also lined up as leaders of the new league.

Together with the announcement of the labor party, Major Berry made public a letter which he has addressed to labor, both organized and unorganized, throughout the country. It concerned those who have been affiliated with various political parties, "but who now manifest a keen desire to join in the promotion of the work attendant to the reelection of President Roosevelt," and the letter urged that they join the league.

(*Turn to page 494, please*)

Retail Sales Near Boom Time Levels

Many Factories Boost Their Schedules to Capacity as Shortage Threatens Dealers

By HAROLD E. GRONSETH

With retail sales approaching boom time levels, automobile factories are hard pressed to meet the requirements of the rapidly expanding market. Dealer orders are piling up at the plants and some of the leading companies have pushed production right up to the hilt, running practically at capacity. One of the volume producers operating full tilt through March is already sold out for April, which is scheduled for capacity output. In another important instance, daily retail orders are running 25 per cent ahead of production. Talk is heard of a shortage of cars when the buying wave reaches its crest which should still be some weeks off.

Dealers reporting weekly showed decided gains in retail volume for the

(*Turn to page 494, please*)

Eyston to Attempt Records in Diesel Class at Bonneville

Special to AUTOMOTIVE INDUSTRIES

An attempt to set up world's short distance speed records in the newly-created Diesel class will be made by G. E. T. Eyston on the Bonneville Salt Flats, toward the end of April. Eyston is bringing to the United States a front-wheel drive car fitted with a 12-cylinder single sleeve-valve engine of a type in which the British Air Ministry is interested for troop carrying planes and for trans-Atlantic flights. It is hoped to attain a speed of 140 m.p.h. over the flying mile.

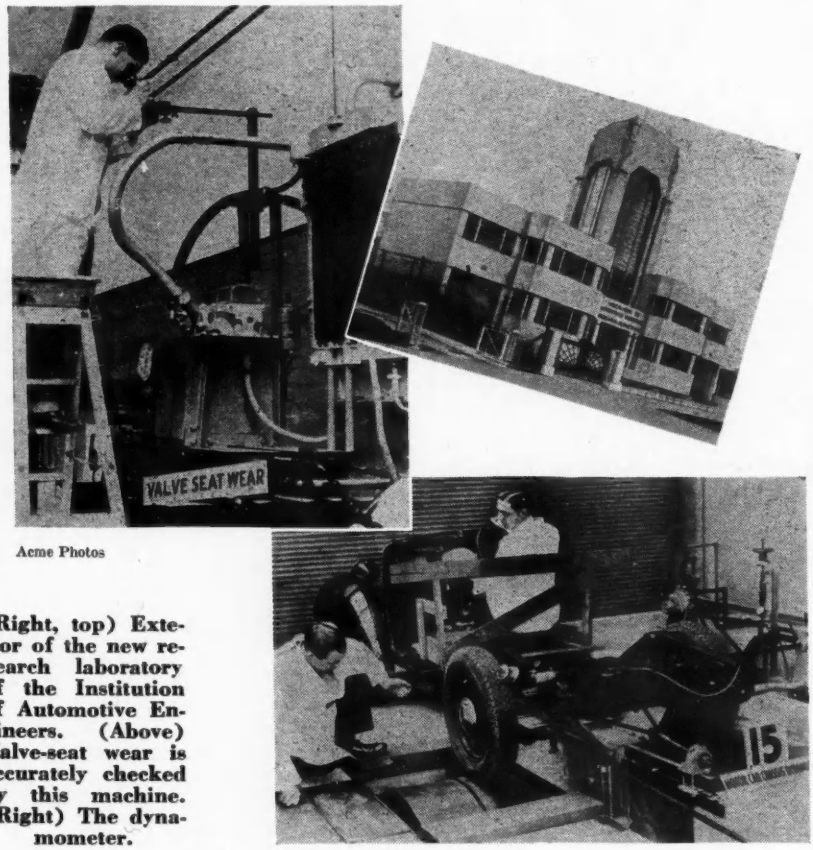
Following this attempt, the Diesel engine will be replaced by a 12-cylinder Rolls Royce gasoline engine with which an effort will be made to better the existing world's long-distance records, most of which are at present held by Eyston.

Reo Has 6% Finance Plan For Commercial Car Buyers

D. E. Bates, president and general manager of the Reo Motor Car Co., has announced that arrangements have been completed with the C.I.T. Corp. to provide Reo dealers with a 6 per cent finance plan for retail buyers of Reo Speedwagons and trucks.

New British Research Laboratory

Car Manufacturers Cooperate with Engineers to Install Modern Testing Facilities



Acme Photos

(Right, top) Exterior of the new research laboratory of the Institution of Automotive Engineers. (Above) Valve-seat wear is accurately checked by this machine. (Right) The dynamometer.

New laboratories for the research department of the (British) Institution of Automobile Engineers have been officially opened by Lord Rutherford, chairman of the Advisory Council of the Government Department of Scientific and Industrial Research. They are located in modern premises originally constructed as a manufacturing plant alongside the Great West Road, near London, at Brentford, Middlesex, acquired at a cost of £17,000; approximately £3,000 has been spent on alterations and furnishings.

These new laboratories indicate the success that has attended the cooperation of British manufacturers of vehicles and components, commenced soon after the war by the Research Association of the British Motor and Allied Manufacturers; in premises (originally built as a private residence, at Chiswick, London) the activities of the latter body were superseded in 1931 by the Research Department of the I.A.E., which took over the premises, equipment and staff.

By the fall of 1934 it had become obvious that the Chiswick premises were no longer adequate, for in the three years 1931-1934 the number of manufacturers and big operators (who also were entitled to membership) subscribing to the enterprise increased from 28 to nearly 200.

Since 1931 the Department has issued 35 research reports and 1750 abstracts covering nearly 200 subjects. The program of work is decided upon after exhaustive inquiry among members and also by requests from individual members requiring information on specific subjects concerned mainly if not only with their own productions. Thus research is of both general and individual interest, the cost in the latter cases being paid by the firm asking for it to be undertaken and a report (usually confidential) to be provided.

The new laboratories are on a site having an area of 32,400 sq. ft., with a frontage of 90 ft. and a depth of 360 ft. There are two main blocks separated by a parking space, and a concrete track 10 ft. wide encircles the

(*Turn to page* 492, *please*)

Graham Will Offer $3 Shares To Its Present Stockholders

Graham Paige Motors Corp., has announced a proposed increase in its authorized capital stock by 1,000,000 shares and a decrease by 165 shares in its 7 per cent cumulative convertible second preferred stock. The company plans to offer 600,000 shares to present holders at $3 a share in the ratio of one new share for each four held. Proceeds will be used to retire two series of notes amounting to $1,000,000 and to provide $800,000 in additional working capital. Large stockholders will underwrite the offering.

Olley of G.M. Sailing For Europe with Family

Diane M. Olley, aged 7½, entertained the audience at the Detroit Free Press Style Show held last week at the Cass Theater with a waltz toe dance. The youthful danseuse informs us that she is leaving shortly for England with her father and mother, Mr. and Mrs. Maurice Olley. Mr. Olley, who is well-known for his work on suspensions and other design questions for the General Motors Corp., will study European developments while abroad.

GM Spent Over $75,000,000 in '35 For Plant Improvements and Tools

Annual report of the General Motors Corp. shows total net sales, excluding inter-company transactions, of $1,155,641,511, a gain of 34 per cent over the $862,672,670 reported for 1934. Total sales of cars and trucks to dealers in the United States and abroad were 1,715,688 units, a gain of 38.3 per cent over 1934, and were 90.3 per cent of the record total of 1,899,267 units sold in 1929.

The report said that the company did 37.5 per cent of the total domestic business in 1935 against 39.7 per cent in 1934, its sales to domestic dealers having been 1,370,934 against 959,494 in 1934, a gain of 42.9 per cent.

Payrolls gained 22.7 per cent to $323,030,599, the highest since 1929.

Net income from all sources, as recently reported, amounted to $3.69 a share on the common stock, against $1.99 in 1934.

For the first time the company made a complete report on the business done abroad. Sales by the German company, Adam Opel, A. G., were 102,765 cars and trucks, of which 91,459 were distributed domestically and 11,306 exported. Sales in 1934 were 71,665 units, with the export percentage a little higher. The company did 42.2 per cent of all German automobile business and had 43.9 per cent of the business of

all German makes. These were new records. Production taxed facilities and a new commercial car plant at Brandenburg was built. The Russelsheim plant will continue to handle passenger car production. Closer connection between sources of materials and plants will reduce prices, it was stated. Opel earnings were $4,705,433, but they cannot be transferred from Germany.

The report covering the British business, handled by Vauxhall Motors, Ltd., showed sales of 48,671 car and truck units, of which 33,357 were sold domestically and 15,314 units exported. Sales set a new record. New plant facilities are being built to cut the cost of production as well as to place the company in the lower price classes where it is not now represented. Larger business proportionate to the total done in the British Isles is expected from this move. Total car and truck sales by all makers in that market in 1935 were 432,200 units against 367,050 in 1934.

The corporation's report further dis-

(*Turn to page 496, Please*)

$30 a Month Finance Plan Adopted by Canadian Ford

A new "$30-a-month" plan for financing retail purchases of new Ford V-8 cars is now in effect throughout Canada, according to Wallace R. Campbell, president of the Ford Motor Co. of Canada, Ltd., Windsor, Ont. The plan, involving substantially reduced finance charges and broad insurance protection for the car purchaser, is being offered through Ford dealers by the Traders Finance Corporation, approved Ford finance company.

Curtiss-Wright's Shares To Be Sold Stockholders

Guy W. Vaughan, president of Curtiss-Wright Corp., announced that at the meeting of the board of directors last week it was decided to provide funds for expansion of engineering facilities and to meet requirements of increased volume of business by an offering of additional shares of common stock to the stockholders for subscription. The rights, he said, will be granted to the holders of Class A stock, as well as the holders of common stock. The price and amount of the offering, he said, will be later determined on a basis considered attractive to shareholders.

Announcement

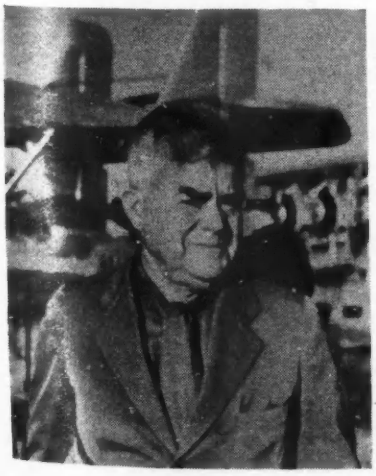
Daniel L. Morris, Esq., with this issue of AUTOMOTIVE INDUSTRIES, becomes a contributing editor, specializing in questions concerning patents, design patents and trademarks. Mr. Morris is a patent attorney and a member of the bar of New York and of the District of Columbia. Much of his professional experience has dealt with cases of automotive interest.

Mexico's First Car Show To Be Held in November

Mexico's first automobile show, similar to those conducted annually in New York and other large American cities, is being arranged for the Palace of Fine Arts (National Theatre) in Mexico City next November by the Mexican Automobile Association. This show, which will coincide with that of New York, will feature various 1937 model cars.

Motor Bus Service to Connect U.S. Border and Mexico City

De luxe American-style motor bus service between Nuevo Laredo, on the American border, and Mexico City, over the international highway, is to be inaugurated late this month by a Mexican enterprise that has acquired a fleet of 20-passenger, ten-berth Pullman vehicles in the United States and which is to operate under a federal concession. The buses will make the journey of 762.6 miles, with stops at all important communities en route, in 24 hours.



"South America sticks out like a sore thumb on the map of the world as the land of business opportunity," said Alfred J. Brosseau, president of the Mack Truck Co. when he arrived at the Coral Gables, Fla., airport after a six weeks' survey of 12 Latin American countries

Acme Photo.

Committee Formed To Review N.R.A.

Roper, Wallace, Perkins To Report Code Studies; Barry Council Continues

The Committee on Industrial Analysis, newly organized by the President, held its first meeting on Tuesday, March 31, and it was unanimously decided that a report on the work of the NRA would be made public by Dec. 1. The committee is headed by Daniel C. Roper, Secretary of Commerce, and includes Henry C. Wallace, Secretary of Agriculture, and Frances Perkins, Secretary of Labor.

It is the purpose of the committee, through the Division of Economics, headed by Dr. L. C. Marshall, to analyze studies of some 650 code operations already made by the skeletonized NRA but never assembled. Associated with Dr. Marshall, as assistant chief, is C. R. Chambers.

The division will report to the Committee on Industrial Analysis at its next meeting, April 10. At this time an outline of the proposed surveys will be presented, together with a statement for approval of the personnel which the division will use in the work, including an advisory committee. The executive order provided for the selection of aides from outside the Government, expected to be chosen from both industry and labor.

Enough data has been gathered by the previous studies, it is believed, to make it possible for the committee to ascertain and preserve what Secretary Roper has called "the assets of NRA." In some quarters it is thought that an effort may be made in some future Congress to revive the NRA legislatively in some modified form.

Meanwhile the Council of Industrial Progress, headed by Major George L. Berry, was continued for another year from April 1, by an Executive order promulgated from his yacht last Monday night.

American Foundrymen's Medals To Dr. Ries and David McLain

The board of directors of the American Foundrymen's Association announces that, acting on the recommendation of its Board of Awards, it is granting the Joseph S. Seaman medal of the association to Dr. Heinrich Ries of Cornell University, in recognition of his outstanding services to the foundry industry and to the association in the field of foundry sand research and control, and to David McLain it has awarded the J. H. Whiting medal in recognition of his contribution to the foundry industry in stimulating better melting practices. The presentation of these medals will be made at the annual dinner of the association held during the 1936 convention in Detroit, the week of May 5 to 9.

S.A.E. Production Meeting

The 1936 production meeting of the Society of Automotive Engineers will be held at the Book-Cadillac Hotel, Detroit, April 21 to 24 inclusive. Planned tours through several of Detroit's most important enterprises, including the famous Greenfield Village and Ford Museum, will be added features of this year's program.

The meeting will be under the auspices of the Production Engineering Activity of the Society of which K. L. HERRMANN is chairman and V. P. RUMELY is vice-chairman. Directly responsible for the program is the Society's Production Meetings Committee consisting of W. B. HURLEY, chairman, D. S. DOVER, P. W. FASSLER, JOSEPH GESCHELIN, R. B. KEITH, W. H. MCCOY, V. P. RUMELY and D. A. WALLACE.

The prgoram is outlined below:

Tuesday, April 21

Afternoon — *Crankshafts and Camshafts*
K. L. HERRMANN, Chairman
Principal speakers: W. F. PIOCH, Ford Motor Car Co.; A. K. ANTONSEN, Fairbanks, Morse & Co.; D. A. VAIL, Campbell, Wyant and Cannon Foundry Co.

Evening — *Balancing*
W. H. MCCOY, Chairman
Principal speakers: S. T. FORESMAN, Chrysler Corp.; E. J. WOLFF, General Motors Corp. Supplementary discussions: WARNER SENGER, Gisholt Machine Co.; B. E. OHLSON, Tinius Olsen Testing Machine Co.

Wednesday, April 22

Afternoon — *Steel*
V. P. RUMELY, Chairman
Tour of Great Lakes Steel Co. E. L. WETSTEIN and JULIUS KLAUSS, both of Great Lakes Steel Co., will be the speakers at a technical session at the plant.

Evening — *Machining*
F. W. CEDERLEAF, Chairman
Principal speakers: R. N. BROWN, Packard Motor Car Co.; JOSEPH WELLS, Pontiac Motor Car Co.

Thursday, April 23

Afternoon — *Aluminum*
D. A. WALLACE, Chairman
Tour of Aluminum Co. of America. Principal speaker will be D. A. WALLACE, Chrysler Corp., on the subject of elliptical skirted pistons.

Evening — *Detroit Section Dinner*
Dinner under the auspices of the S.A.E. Detroit Section, at the Book-Cadillac Hotel. Reservations should be made in advance at Detroit Section office, Room 2-136 General Motors Building.

Friday, April 24

Morning — *Ford Tour*
Visit to Greenfield Village and Ford Museum. At the luncheon at Dearborn Inn, W. J. SIMONDS, curator of the museum, will tell about "The Early American Village."

Afternoon — *Safety Glass*
J. E. PADGETT, Chairman
Tour of Ford Foundry and Glass Works. R. H. MCCARROLL, Ford Motor Co., will be the speaker at a session at the plant.

On Wednesday and Thursday morning, arrangements have been made to make informal visits to 10 of the interesting manufacturing plants in Detroit.

Clark Tells Detroit Meeting Of Spot Welding Developments

Taylor-Winfield Corp. was host to the Detroit Chapter of the American Welding Society at its March meeting last week. Some 250 members and guests of the society inspected the Detroit plant of the company and heard a talk by M. S. Clark, Taylor-Winfield general manager.

Mr. Clark took as his subject "The March of Welding," referring particularly to the advances made in the art of resistance welding during the past 12 months. It is of interest to learn that great progress has been made in the agricultural field, where resistance welding has been adopted for the production of tractor wheels, frames, and implements.

Much has been done in the way of refinements in the art of seam and spot welding of the aluminum alloys. This advance has been brought about through the more general use of timing controls. A flash welder for aluminum sheets also has been developed and is now a commercial possibility.

One of the biggest developments in resistance welding is the Hart process of projection welding for the fabrication of T-welded joints in tubular sections. Patents for the process are controlled by Republic Steel, but Taylor-Winfield is licensed in the development of commercial welding equipment. This method opens up new possibilities in the production of tubular seat frames such as on the Chrysler Airflows, seats for buses and railcars, and more particularly in the framing of tubular body structures. The process produces strong welds free of all discoloration, thus making possible the welding of stainless steel or chromium-plated tubing.

Several new items of equipment were shown at this meeting. Perhaps the most impressive of these was a huge combination press and spot welder designed for the fabrication of 1937 frames for one of the large car builders. It exerts a pressure of 200,000 lb. for forming and with the die down produces 220 spots in nine seconds. The machine weighs 135,000 lb.

Another new development is a portable spot welder which will be used for 1937 body production. It was shown with the Clark Controller timing control, which makes possible 400 spots per minute of spots of high strength and quality. One of the special machines recently developed by Taylor-Winfield is a heater unit for surface hardening special automotive parts. This particular machine has a circular indexing table with six stations, each accommodating two pieces. It heats the pieces at one station and then ejects automatically at an adjacent station.

Studebaker Awards Prizes; Breaks All Export Records

The board of judges appointed to consider entries in a sales promotion contest sponsored by the Studebaker Export Corp. met aboard the liner Paris at its New York dock recently to judge the efforts of the contesting dealers.

First prize of $200 in cash was won by Compania Comercial Metropolitana, S. A., distributors in Mexico City, Mexico. Second prize, $100 in cash, went to Edgar C. Motta, Kinkston, Jamaica, and the third prize of $50 in cash went to Natal Motor Industries, Ltd., Durban, South Africa.

In announcing the results of the contest, A. L. Frank, president, said, "Studebaker's February export volume was the largest for any month since October, 1928. For the third time in six months a new all time high record will be established in March for exports of Studebaker trucks. Previous all time records were achieved in October of last year and January of 1936."

Detroit A.S.T.M. to Hold Spring Meeting on April 7

The American Society of Testing Materials has scheduled its Detroit district spring meeting for April 7, according to an announcement by W. H. Graves, Packard chief metallurgist and chairman of the Detroit district committee. Preliminary talks will be made by W. H. Graves, Hervey S. Vassar, president of the A.S.T.M., and C. L. Warwick. The principal talk, by John Johnston, director of research of the U. S. Steel Corp., is entitled "The Use and Abuse of Tests."

Jack Frost

Jack Frost, executive vice-president of the National Automobile Dealers Association, died in a hospital at Omaha, Neb., on March 26. Mr. Frost had contracted scarlet fever while on a business trip to Omaha. An infection set in and an emergency operation failed to save his life.

Mr. Frost was 40 years old. He had been active in the automobile business as a salesman and dealer since leaving college. He was a partner of Frost and French, Ford dealers in Los Angeles. Mr. Frost was well known throughout the industry because of his interest in used car merchandising methods which he had studied for years.

In 1933 Mr. Frost became associated with the N.A.D.A., in charge of publication of the official used car guide which established used car allowance prices under the NRA dealer code. Later he was appointed assistant to the president, and last January was elected vice-president of the association.

Jack Frost

Mr. Frost is survived by his widow, a son and his parents, all of whom live in Los Angeles.

Earnings Statements of Automotive Companies

	1935	1934
Vehicle Manufacturers		
Graham-Paige Motors Corp.	$1,701,325*	$474,959*
Reo Motor Car Co.	219,860*	958,341*
Twin Coach Co.	571,918	201,355
Other Automotive Companies		
Ex-Cello-Aircraft & Tool Corp.	329,165	140,301
Stewart-Warner Corp.	1,724,313	571,968
Timken-Detroit Axle Co.	1,173,202	426,125
Timken Roller Bearing Co.	7,483,602	3,486,056
Sperry Corporation	1,651,461	1,878,104
Young (L. A.) Spring and Wire Corp.	1,816,108	811,483
United-Carr Fastner Corp.	729,973	498,088
Oil Companies		
Standard Oil Co. of Indiana	30,179,000	18,949,680
Texas Corp.	17,065,037	5,545,205

* Net loss.

A. D. GARDNER has joined the Wilcox-Rich Corp. as development engineer. Mr. Gardner was formerly with the research department of the Studebaker Corp. and until recently was chief engineer of the Automatic Fan & Bearing Co. of Jackson, Mich.

ALBERT V. CRUMP, formerly with Briggs Mfg. and Graham-Paige, has joined the engineering department of Ackerman-Blaesser-Fezzey, Inc., manufacturers of the "Common-Sense" line of window regulators and concealed hinges. This connection is expected to enhance their facilities for rendering personal service on special problems.

C. W. DIETRICH, JR., was recently appointed sales engineer for the Torrington Co. and the Bantam Ball Bearing Co. in the New York territory, with headquarters at 200 Fifth Avenue.

R. A. GRISWOLD, who has been with the sales organization of the Bantam Ball Bearing Co. since last October, has been assigned the Connecticut and Massachusetts territory, with headquarters at Hartford.

Charles S. Lockwood

Charles S. Lockwood, who worked with John Wesley Hyatt on the invention of the Hyatt roller bearing, died in Newark, March 20, in his 86th year.

As an active member of the Hyatt experimental laboratory staff almost up to the time of his passing, Mr. Lockwood's career covered 62 years of service in the employ of John Wesley Hyatt and the companies Mr. Hyatt founded, and more than 44 of these were devoted to the Hyatt Roller Bearing Co.

When a lad in his twenties, Mr. Lockwood became associated with Mr. Hyatt. Mr. Hyatt had just invented celluloid, and Mr. Lockwood came to Newark to serve as manufacturing superintendent of the Celluloid Corporation. Later he took over a similar position in another Hyatt enterprise, the Bonsilate Co. of Albany, N. Y., manufacturers of plastics. In the late 80's he returned to Newark, N. J., and worked with Mr. Hyatt on improving sugar cane crushing machinery. From a bearing problem encountered on this machine, the Hyatt roller bearing was conceived to overcome the difficulty. A few years later the sugar machine idea was passed on to other hands, and Mr. Hyatt formed the Hyatt Roller Bearing Co. with Mr. Lockwood as chief engineer. Mr. Lockwood had nearly 100 patents registered in his name.

Keeshin Given B. & O. Local Delivery Contract

Keeshin Motor Express and Keeshin Transcontinental Freight Lines have been awarded contracts with the Baltimore & Ohio Railroad for store-door pickup and delivery service in all of the principal cities served by the railroad. The contract covers Illinois, Indiana, Ohio, upper New York, District of Columbia, and parts of Maryland, Virginia and Kentucky.

In placing its contract with the Keeshin companies, the B. & O. becomes the first of the trunk line railroads to cooperate with trucking companies. The Keeshin concern will subcontract its business in many communities. Recent acquisitions by the Keeshin interests have widened the company's operations to 32 states.

Packard "120" March Volume Breaks All Delivery Records

Packard deliveries in March, totaling 6785 cars, were one-third greater than expected and exceeded those of any other month since the Packard "120" was introduced, according to M. M. Gilman, vice-president and general manager. The biggest previous March in point of deliveries was in 1929 when 5377 units were delivered. Shipments for last month totaled 6779 units which compares with 4428 in March, 1928, the previous high for that month.

Unfilled orders on hand April 1 totaled 7500 units. Schedules for the month have been increased to 8000 units, and are expected to exceed the October, 1935, production record of 7039 cars. The new schedule calls for an increase in production capacity for the "120" from 240 to 342 units per day.

Although present volume is higher than the 1929 level, dealers' stock in that year were nearly 20 per cent greater than now. While demand for the "120" is passing all records, it is reported that there is an encouraging uplift in sales for the senior line.

Market Development Company Organized by Athel Denham

Denham and Co., with offices in the Book Building, Detroit, has been organized to provide complete market development services for companies in the industrial and trade fields. Athel F. Denham, president, was until a year ago, Detroit editor of the Chilton publications.

Representative Jennings Randolph of West Virginia, a member of the Committee on Roads, has introduced a resolution proposing the appointment of a committee of highway and government officials to make a report by Dec. 1 on the feasibility of private industry building a huge net of super-transcontinental highways 450 ft. wide.

S.A.E. Tractor Meeting

The 1936 tractor meeting of the Society of Automotive Engineers will be held at the Hotel Schroeder, Milwaukee, April 15 and 16. The meeting will be under the auspices of the Tractor and Industrial Power Equipment Committee of the Society of which A. W. LAVERS is chairman, and ELMER MCCORMICK is vice-chairman. Directly responsible for the program is the Tractor Meetings Committee consisting of C. E. FRUDDEN, chairman, G. W. CURTIS and C. G. KRIEGER.

The program is outlined below:

Wednesday, April 15

Morning — *Highway Maintenance*
ELMER MCCORMICK, Chairman
E. L. ROETTIGER, State Highway Engineer for the Wisconsin State Highway Committee, will be the principal speaker.

Luncheon — *Schlitz Brewery*

Afternoon — *Tour, Waukesha Motor Co.*
J. B. FISHER, Director of Tour

Evening — *Milwaukee Section Session*
C. M. EASON, Chairman
C. R. MESSINGER, Oliver Farm Equipment Co., will address the meeting. RALPH R. TEETOR, president and JOHN A. C. WARNER, general manager of the S.A.E., are expected to be present.

Evening — *Army Ordnance Equipment*
Technical Session
W. B. KEESE, Chairman
MAJOR J. K. CHRISTMAS, U. S. Army Ordnance Dept., will describe mechanization of Army Ordnance Equipment with particular reference to tractors.

Thursday, April 16

Morning — *Performance and Fuel Economies*
A. T. COLWELL, Chairman
R. W. YOUNG, Wright Aeronautical Corp., will be the speaker.

Afternoon — *Fuels*
O. E. EGGEN, Chairman
EARL BARTHOLOMEW, Ethyl Gasoline Corp.; A. W. LAVERS, Minneapolis Moline Power Implement Co.; R. C. CHESNUTT, Cleveland Tractor Co., and PROF. R. I. SHAWL, of the University of Illinois, will discuss tractor engine fuels.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES

Despite the floods covering large areas of the country last week, business activity as a whole continued to rise. Rehabilitation work in the devastated sections is expected to stimulate several lines, particularly building.

According to a report issued by the Board of Governors of the Federal Reserve System, there was little change in industrial production and employment during February. Distribution of commodities remained at about the January level. During the month ended Feb. 15, factory employment increased by less than the usual seasonal amount.

Guaranty Index Higher

The Guaranty Trust Co.'s index of business activity for February stood at 79.5, as against 77.7 the month before and 73.6 in the corresponding period last year. The company's index of wholesale commodity prices on March 15 was 54.1, as compared with 53.7 a month earlier and 50.1 a year earlier.

Electric Output Steady

The floods have delayed the compilation of complete data in regard to production of electricity during the week ended March 21, but the Edison Electric Institute has estimated output at 7.8 per cent above that in the corresponding period last year. Production in the preceding week was 10 per cent above that a year earlier.

Lumber Production Rising

Production of lumber during the week ended March 14 was 60 per cent of the 1929 weekly average. With the exception of two weeks last April, new orders were higher than in any other week since the beginning of 1935, while both production and shipments were the highest since last fall.

Petroleum Output Higher

Average daily crude oil production for the week ended March 21 amounted to 2,835,950 bbl., as compared with 2,808,350 bbl. for the preceding week and 2,600,100 bbl. for a year ago.

Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended March 28 stood at 82.6, as against 82.5 the week before and 82.4 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended March 25 showed no changes in holdings of discounted bills, bills bought in the open market, and government securities. Money in circulation declined $4,000,000, and the monetary gold stock increased $4,000,000.

New British Motor Research Laboratory

(*Continued from page 488*)

buildings, giving access by car or truck to all parts. The front two-story block is surmounted by a tower containing the 1000-gal. water tank. The first floor contains four offices used by the technical staff, and a well-furnished committee room with walnut paneling. The ground floor holds a large general office, duplicating room and library, in which are books, periodicals, abstracts and reports accumulated over the past 16 years.

Leading off the octagonal-shaped hall is a central corridor, on either side of which are the chemical and materials-testing laboratories. The materials-testing laboratory contains a five-ton Buckton testing machine fitted with autographic equipment, a Vickers pyramid hardness machine, an Avery fatigue machine, a Vickers projection microscope, and sundry other apparatus. Attached to this laboratory is a dark-room having a blackened labyrinth entrance.

The central corridor terminates in a large bay housing two chassis dynamometers. Both are of the Heenan and Froude water brake type. Vehicles can also be connected to a drawbar associated with a torque arm so that direct measurements of tractive effort can be made.

Next to the chassis laboratory is the engine laboratory; it contains eight test beds, four of which are fitted with electric dynamometers and four with hydraulic dynamometers, with a 1-ton runway overhead. Adjacent to this laboratory is a works office, and a room where worn parts are examined by conventional gages reading to 0.0001 in., or by a Solex pneumatic gage, reading to less than 0.00001 in. This room is fitted with a thermostatic arrangement for maintaining an approximately uniform temperature.

Workshop and stores are in the rear block. The stores are adjacent to the car park and there is an external loading platform from which machines can be conveyed through two large entrances fitted with roller shutters. The workshop is equipped with a lathe, two drilling machines, a sawing machine, two small grinding machines, gas-fired forge, etc. The general laboratory is the largest on the premises and is used for mechanical testing or research other than engine research. The equipment necessarily varies according to the nature of the program of research, but, at the present time, it includes machines for studying big-end bearings, gears, brakes, exhaust valves, and engine friction at low temperatures. The present program (1935-36) includes cylinder and piston wear, valve seat wear, brake squeak, limiting loads and temperatures on big-end bearings, lubricating oil consumption, corrosion of ball bearings in storage, cold starting of gasoline engines, gear wear and durability, impact of tires on roads, cast materials for crankshafts, and deep-drawing of sheet steel. The ceilings of this laboratory and the workshop are covered with sound-absorbing material. There is a further bay available for any extension of general testing. The floor is fitted, in places, with removable iron covers giving access to two underground compartments, one of which is very large. These compartments are available for storage purposes, or can be used for experiments inevitably noisy, or for which it is desirable to maintain a uniform temperature.

The work of the Department is financed partly by grants from the Department of Scientific and Industrial Research and from the Society of Motor Manufacturers and Traders. In addition, individual companies wishing to take part in this cooperative effort become affiliated to the Institution and contribute toward the cost of the work. The amount of the Government grant depends on the amount subscribed by the industry.

40 Years Ago

with the ancestors of AUTOMOTIVE INDUSTRIES

Foreign Notes

Aluminum is now undergoing experiments at the hands of some of the French motor vehicle builders.

According to a recent police report, there are 426 motor vehicles in use in the city of Paris, and a large number in the provincial districts.

The London Road Car Co. and the Compagnie Générale des Omnibus of the same city are simply waiting for the repeal of the "Road Locomotive Act" to introduce motor buses in the English metropolis.—From *The Horseless Age*, April, 1896.

The WORLD on WHEELS

1. Construction of Florida's ship canal continues although the Senate has refused to appropriate funds. Operations at the Harvey Ray-Noonan camp include this "bulldozer" at the left while a conveyor belt sends sand to the 22-ft.-high spoil banks

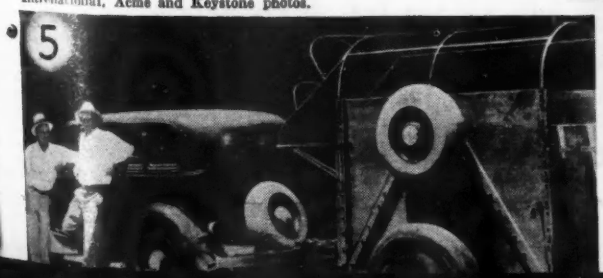
2. Mrs. Roy Eccles, between laps at 90 m.p.h., knits while a mechanic checks her Eccles Special on the speedway at Brooklands, England

3. Traveling over three million miles on Iowa highways, in the past four years, 19 ambulances of this type have brought the indigent sick of the State to the University Hospital in Iowa City for free medical and surgical care

4. Alfred E. Smith christens one of the new Lexington Ave. buses at the inaugural ceremonies held last week in New York City

5. The end of the road is no stopping place for Inspector Horace Ryman, U. S. Customs official, stationed at Sells, Ariz. His duty is to stop smuggling of aliens from across the Mexican border in the extreme wilderness of this section. So when Ryman can drive no further he produces from his unusual trailer, a horse, together with its necessary feed, and continues on his way

Intrenational, Acme and Keystone photos.



American Petroleum Industry, 1935. Published by American Petroleum Institute, 50 West 50th Street, New York, N. Y., 1936. A survey of the present position of the industry and its outlook toward the future. Price on application to the publishers.

Imperial Airways, Ltd. Speech of the Rt. Hon. Sir Eric Geddes, chairman of the board of directors at 11th general meeting, held Oct. 31, 1935. Plans and progress of the company as well as the financial report are discussed.

Proceedings at the 16th annual meeting of the **American Petroleum Institute,** held at Los Angeles, Nov. 11 to 14, 1935. Copies available from the Institute.

America's Transportation, Vol. 1, No. 1. Published by the Transportation Association of America in the interest of a sound transportation system and in support of private enterprise in business. Copies available from the Association, Transportation Building, Chicago, Ill.

Registration Fees and Special Taxes for Motor Vehicles is subject of Highway User Series No. L2, published by the National Highway Users Conference, National Press Building, Washington, D. C. Fees and Taxes are listed by state giving data for passenger cars, commercial vehicles and all special considerations. Available from the publishers. Price $1.25.

Job Specifications for the Automobile-Manufacturing Industry. A very complete work in three volumes prepared by the Occupational Research Program Division of Standards and Research under the auspices of the U. S. Department of Labor. Vol. 1 contains, in addition to introductory remarks and charts, job specifications for foundry, forge, sheet-metal, spring and production-machining departments. Vol. 2 covers Heat-treating, tool and standards, wood-mill, body-in-white and paint departments. Vol. 3 has an alphabetical index to all job specifications and covers body-trim, body-assembly, assembly and bench, stores and receiving, traffic, construction and maintenance and miscellaneous departments.

Double, Double

(*Continued from page 487*)

"It is the intention of Labor's Non-partisan League," the letter continued in part, "to enter into a campaign vigorously and to meet on the political field the efforts of the reactionary and defeatist elements who seek the defeat of the President. . . . I regard it as a sacred duty that we give our time and services in securing the President's re-election. . . . It is, of course, quite apparent that there is yet much to be done in completing a program that will make more responsive the great opportunity that this nation offers for happiness and security for all of its citizenship, and upon this basis I feel his reelection is of fundamental importance."

Retail Sales Near Boom Time Levels

(*Continued from page 487*)

week ended March 28, indicating that big increases will be recorded for the final ten days of the month by companies receiving ten-day reports. It is now estimated that domestic sales of passenger cars last month exceeded 320,000 units, while truck sales were probably well over 50,000, with combined sales somewhere in the neighborhood of 375,000 units. The extent of the upturn is revealed by comparison with February deliveries of 222,000 cars and trucks, the indicated gain for March being roughly 69 per cent.

Practically all companies broke away from their original March schedules, some making several upward revisions in the course of the month. In fact, the trend was constantly higher so that in the absence of actual figures a reliable estimate of the industry's March output cannot be made. Final figures, however, are expected to show that the industry last month turned out approximately 425,000 vehicles, an increase of nearly 40 per cent over the February output, and well above early projections. In March last year, when the industry was just getting into full swing on its 1935 models, productions totaled 451,768 units.

Last month's spurt in production brought the first quarter's output just about on a par with the first three months of 1935 when 1,108,941 units were built, but a few thousand vehicles short of the heavy fourth quarter output last year when plants were rushing to supply dealers. With the 1936 models that went into production as the quarter began and a total of 1,116,451 units were turned out. Schedules for the current month indicate an output of at least 450,000 vehicles.

Buick

Buick Motor Co. has increased its April production schedule to 16,654 units in order to take care of 10,000 accumulated unfilled orders, the largest backlog since the new models were introduced . . . "The turn of spring business is fulfilling our best expectations," said Harlow H. Curtice, president. "We are building more than twice as many cars as at this time last year, while sales are in excess of this ratio" . . . All plants of the company have been on a five-day week since early March and the new schedule will necessitate lengthening of shifts in several divisions.

Hudson-Terraplane

U. S. Retail sales of Hudsons and Terraplanes for the two weeks ended March 28 totaled 4373 units which betters all records for that period in six years . . . Special showings of new body types and colors throughout the country are stirring up unprecedented interest, according to William R. Tracy, vice-president.

Lincoln-Zephyr

U. S. Retail deliveries of V-12 Lincoln-Zephyrs reached a new high for 1936 in the second 10-day period of March, with total of 424 cars . . . Production of these cars at the Lincoln plant in Detroit has been raised to a level which permits reasonably prompt delivery.

Studebaker

Retail deliveries of Studebaker cars and trucks totaled 3803 units for the first 20 days of March compared with 2298 in the corresponding period of 1935, according to Paul G. Hoffman, president, an increase of 65 per cent. . . . Increase for the year to date is 49 per cent.

European Visitors

Goudard of France and Porsche of Germany Expected in U. S. Soon

Dr. Ferdinand Porsche, one of the leading German automobile engineers, will sail for the United States early in April and, being interested in the purchase of machinery, will spend a few weeks in the Detroit territory looking over the automobile factories.

Doctor Porsche is best known for his work in connection with the design and construction of the Auto Union racing machines, which are undoubtedly the most successful and most advanced racing productions in the world. Built under the international racing rule which limits weight to 1650 lb. empty without tires, the Porsche-designed machines have a 16-cylinder rear engine of about 305 cu. in. (the exact piston displacement has never been revealed), with rear-wheel drive.

The radiator is in front, with the cooling water going to the motor through the tubular frame members. The motor is supercharged. Light alloys are used throughout both the motor and the chassis and it is by reason of the use of these alloys that it has been possible to get a 300-hp. motor in a chassis weighing complete less than 1650 lb.

Doctor Porsche is still attached in a consultive capacity to the Auto Union racing organization, but he is now particularly interested in experimental work at Stuttgart, Germany.

Andre Dubonnet, well-known French automobile designer, will arrive at New York on April 8.

(Left) Dr. Ferdinand Porsche.

(Right) Maurice Goudard, president of the Société des Ingénieurs de l'Automobile and of the Solex Carburetor Co. of France, who will visit this country next month. (Automotive Industries, page 391, March 14, 1936.)

Pontiac's Workers to Give 20,000 Hours to Charity

Wages resulting from upward of 20,000 man-hours of work in the Pontiac Motor Co. and Fisher Body Corp. plants in Pontiac will help swell donations to the city of Pontiac community chest and will represent the contribution of the 10,000 employees in those plants, according to a joint statement issued by the heads of the two concerns.

Plymouth's "Westchester" Station Wagon Announced

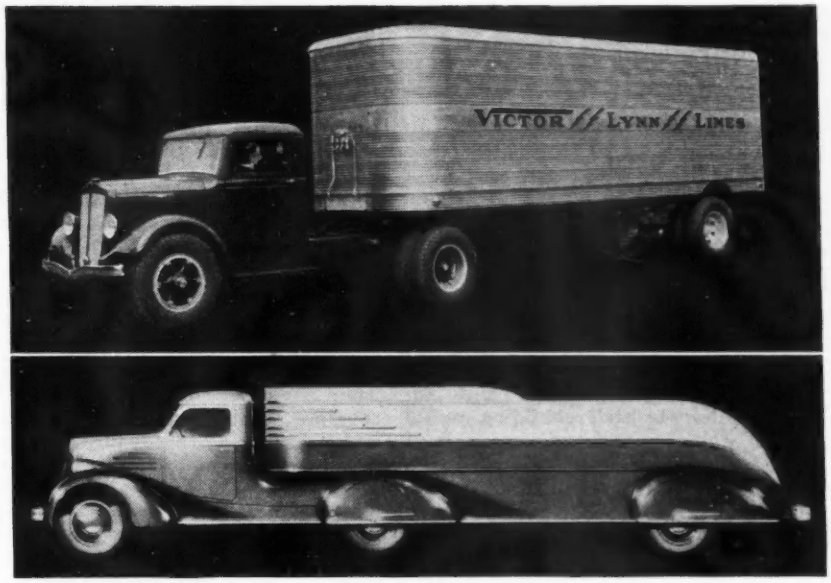
A new station wagon model which by providing an aisle along the right side of the car eliminates the necessity of climbing over the center seat to reach the rear compartment is announced by the Plymouth Division of Chrysler Corp. The new "Westchester" semi-sedan for suburban use is already in production. It lists at $765.

February Retail Financing 25 Per Cent Over Year Ago

February dollar volume of retail financing of new passenger cars showed an increase of 3 per cent over January and an increase of 25 per cent over February, 1935, according to preliminary estimates released by the Bureau of Foreign and Domestic Commerce. The figures are compiled from the dollar volume of identical firms representing over three-quarters of the total financing business.

Goodyear Adds 2 Directors; All Officers Are Reelected

Two new officers were added to the board of directors of the Goodyear Tire & Rubber Co. at its annual meeting in Akron, March 30. E. J. Thomas, who recently returned from England, where he was general manager of the Goodyear British tire factory, was named assistant to Paul W. Litchfield, who was reelected chairman and president. H. J. Young was named assistant comptroller. All other officers were reelected, including R. S. Wilson, vice-president in charge of sales; P. E. H. Leroy, vice-president and treasurer, and C. A. Stillman, vice-president.



(Above) Light-weight stainless steel and shot-weld construction bring the weight of this 24-ft. semi-trailer down to 5200 lb., adding thereby a ton or more to the payload. The Edward G. Budd Mfg. Co. built this semi-trailer for the Victor Lynn Lines of Milford, Del.

(Below) The Fruehauf Trailer Co. shows how streamlining can enhance the beauty of delivery vehicles. This semi-trailer unit was designed for a plumbing supply house, to be used in connection with a 1½-ton tractor.

Knudsen Says Broad Recovery To Continue at Least 2 Years

(*Continued from page 487*)

"Virtually without exception," said Mr. Knudsen, "our plants are now on a five-day week. We are on a broad movement of recovery. Allowing for seasonal declines, business will continue to improve for two years at least. I can't find anything to support the theory that election years are off years. If economic conditions are good, business is good."

Mr. Knudsen stated that fall announcement of new models had proved a success with the corporation. At least it had shown progress in elimination of fluctuations in employment and production. "There has been less variation in our monthly operations than ever before," he declared. "Since the first week of January, employment has not varied more than 4 per cent, and the variation in average hours worked per week was only 11 per cent."

February Car Sales Value 6 Per Cent Under January

The value of retail sales of new passenger cars in February was approximately 6 per cent below January, and 10 per cent lower than the February, 1935, figure, according to the preliminary index figures released by the Bureau of Foreign and Domestic Commerce.

On the basis of the 1929-1931 average equal to 100, the February unadjusted index stood at 65.3, compared to 69.3 in January and 72.7 a year ago.

New Truck Registrations

	January 1936	December 1935	January 1935	Per Cent Change, Jan. '36 over Jan. '35	Numerical Change, Jan. '36 over Jan. '35	Per Cent of Total January	
						1936	1935
Chevrolet	15,124	12,475	9,867	+ 53.2	5,257	34.57	28.39
Ford	14,606	13,764	13,260	+ 6.1	1,346	33.38	38.15
Dodge	6,207	4,634	5,141	+ 20.8	1,066	14.18	14.79
International	4,743	4,052	3,513	+ 35.0	1,230	10.84	10.11
Diamond T	495	513	550	− 10.0	− 55	1.13	1.58
G. M. C.	428	1,344	858	− 50.1	−430	.98	2.47
White	409	370	281	+ 45.4	128	.93	.81
Reo	339	551	380	− 10.9	− 41	.77	1.09
Federal	223	203	152	+ 46.6	71	.51	.44
Plymouth	193	120	5	.....	188	.44	.01
Willys-Overland	178	197	9	.....	169	.41	.03
Studebaker	143	99	127	+ 12.7	16	.33	.37
Brockway	94	111	86	+ 9.3	8	.21	.25
Mack	90	141	114	− 21.0	− 24	.21	.33
Stewart	85	99	42	+102.4	43	.19	.12
Indiana	84	132	27	+211.0	57	.19	.08
Autocar	75	157	71	+ 5.8	4	.17	.20
Terraplane	59	16	29	+103.5	30	.13	.08
Divco	53	86	16	+232.0	37	.12	.05
F. W. D.	19	21	14	+ 35.9	5	.04	.04
Sterling	8	17	10	− 20.0	− 2	.02	.03
Twin Coach	1	6	9	− 88.8	− 8	.....	.02
Miscellaneous	104	150	198	− 47.5	− 94	.25	.56
Total	43,760	39,258	34,759	+ 26.1	9,001	100.00	100.00

G.M. Spent $75,000,000 for Improvements in 1935

(Continued from page 489)

closed that there was spent in 1935 for plant improvements $51,160,000, and that, in addition, $24,510,000 was spent for production tools. Of the latter sum $23,720,000 was charged to operating expense. Alfred P. Sloan, Jr., president, said in his comments on the figures, that the company believes there is a wide opportunity for the production and sale of both consumers' and producers' goods. He remarked that even with the constant improvements, plants today are obsolete and rebuilding would provide work for thousands as well as lower manufacturing costs when the task was completed.

The policy of the corporation is to decentralize its operations. At the end of the year it was manufacturing in 16 communities, assembling in nine and doing combined work of both types in six more. Mr. Sloan said the policy is one of spreading the burden and benefits as widely as possible.

Of the course of the company's business, Mr. Sloan said that the large sales in the final quarter of last year were traceable to the fall show experiment. He stated, "the earnings of future years, however, should not be adversely affected unless the previous practice of introducing new models in January should be reinstated."

Mr. Sloan added that a $57,726,961 increase in inventories in the fourth quarter reflected both the increased volume of business resulting from the fall shows in that period, and a deliberate increase of inventories in an effort to stabilize employment.

Of the matter of automobile distribution, Mr. Sloan said that the effect of constant development of cars is to make the world "reasonably dissatisfied with what it has, so far as automotive products are concerned." He said it works out so that a buyer does not drive any one car too long and at the same time makes possible a flow of relatively up-to-date used cars into the market, "making available motor car transportation values that otherwise would be impossible at anything approaching an equal price." Mr. Sloan praised the new General Motors Acceptance Corp. time financing plan as less costly to the consumer. Time payments account for about half of the retail sales of new cars each year, he said.

Mr. Sloan reported that the average working hours per week increased about 11 per cent and that the average hourly rate rose about 5 per cent to the highest point in the company's history, 5 per cent over the 1929 level. He said the company believes that unemployment follows undue shortening of hours because of the reduction of plant capacity that accompanies such shortening.

Executive salaries cost 7 cents per share of stock in 1935, and the operation of the bonus plan added another 11 cents per share. Such salaries amounted to 25 cents per $100 of sales and to a total of 3 cents per dollar of payrolls.

In discussing the growing control over motor transportation, Mr. Sloan said: "The accepted standards of transportation cost will be the yardsticks of the past. The consideration of existing facilities, including relics of the past, will tend toward a disregard of the pos-

Automotive Exports Up 17% in First Two Months; Overseas Truck Shipments Increased by One-Third

Exports and Imports of the Automotive Industry for February and Two Months Ended February 1936-1935

EXPORTS	February				Two Months Ended February			
	1936		1935		1936		1935	
	Number	Value	Number	Value	Number	Value	Number	Value
Motor Vehicles, parts and accessories	....	$22,142,805	....	$20,522,284	....	$44,225,716	....	$37,730,628
PASSENGER CARS								
Passenger cars and chassis	15,944	9,270,425	15,067	8,767,060	31,723	18,166,862	26,102	15,330,797
Low price range $850 inclusive	14,366	7,561,863	13,692	7,258,366	29,095	15,237,459	23,689	12,620,323
Medium price range over $850 to $1,200	1,348	1,294,186	1,072	1,034,356	2,166	2,078,841	1,764	1,692,177
$1,200 to $2,000	154	223,383	125	193,362	297	429,112	272	429,150
Over $2,000	76	190,993	95	250,634	165	421,450	204	524,163
COMMERCIAL VEHICLES								
Motor trucks, buses and chassis (total)	9,897	4,913,997	6,760	3,640,870	19,653	9,781,658	13,351	7,058,223
Under one ton	1,242	425,603	671	224,848	2,912	1,028,996	1,105	379,953
One and up to 1½ tons	6,654	3,015,040	4,895	2,139,345	13,362	6,108,086	9,874	4,413,322
Over 1½ tons to 2½ tons	1,238	911,260	970	753,422	2,396	1,724,275	1,998	1,531,057
Over 2½ tons	386	423,076	187	483,507	587	755,389	309	681,212
PARTS, ETC.								
Parts except engines and tires	....	.....	....	.....	....	.....	....	.....
Automobile unit assemblies	....	4,404,542	....	5,358,944	....	9,531,804	....	9,913,287
Automobile parts for replacement (n.e.s.)	....	1,963,393	....	1,857,616	....	3,910,992	....	3,753,505
Automobile accessories (n.e.s.)	....	274,232	....	272,232	....	614,026	....	479,529
Automobile service appliances	....	345,873	....	297,320	....	763,281	....	476,348
Airplanes, seaplanes and other aircraft	33	478,613	20	595,071	57	1,042,198	46	1,678,133
Parts of airplanes, except engines and tires	....	376,411	....	281,202	....	678,011	....	642,232
INTERNAL COMBUSTION ENGINES								
Stationary & Portable								
Diesel and semi-Diesel	19	114,762	16	45,292	71	300,568	69	105,213
Other stationary and portable	....	.....	....	.....	....	.....	....	.....
Not over 10 hp.	714	50,438	504	35,338	1,489	106,916	1,555	85,208
Over 10 hp.	269	65,318	91	61,838	449	159,566	188	142,455
Automobile engines for:								
Motor trucks and buses	3,649	341,440	272	32,447	5,951	557,106	386	57,921
Passenger cars	5,964	450,009	2,660	180,707	10,763	767,570	4,770	316,330
Engines and aircraft	37	137,743	22	79,283	83	340,538	54	190,479
Accessories and parts (carburetors)	....	174,268	....	131,055	....	309,473	....	236,773
IMPORTS								
Automobiles and chassis (dutiable)	54	28,496	33	27,198	109	47,025	73	52,287

sibilities that engineering and manufacturing progress offers in the form of lower transportation costs.

The earnings statement and the company's explanation showed the payment of a special employee bonus at the end of the year of $4,647,025 in the form of $25 to each eligible person, a non-operating profit of $2,603,541 from the sale and revaluation of securities, a charge of $1,510,577 for the reduction of goodwill account, and the exclusion of certain untransferable foreign earnings of $5,659,475, including $4,705,433 from the Adam Opel works in Germany.

Canadian Factories Built 13,268 Cars in February

Automobiles produced in Canada last February totaled 13,268 cars, against 18,114 in February, 1935. The month's output included 10,853 passenger cars and 2415 trucks, of which 6367 passenger cars and 1758 trucks were for sale in Canada and the balance for export. Customs figures for February show 356 cars were imported and 4583 exported, against imports of 329 and exports of 4858 in February, 1935.

Chevrolet Dealers' Broadcast To Feature Well-Known Stars

Rubinoff and his violin, Jan Peerce, tenor, and Virginia Rea, soprano, with Graham McNamee, ace announcer, the artists who for several months have been heard on Chevrolet's Saturday night radio program, are soon to be featured also on the "Musical Moments" series sponsored by Chevrolet dealers through the facilities of the World Broadcasting System. Arrangements have been completed for Rubinoff to appear on 39 quarter-hour programs and for the two vocal artists to appear on 13 each. Guest artists will be featured on 13 other concerts.

METALS..

Steel Operations Reach 62%; Rolling Mills Near Capacity

Having inherited from the preceding quarter a heavy hacklog of automotive business, flat-rolled steel producers are assured of high operating rates over virtually the remainder of the month, the fly in the ointment to them being that most of this steel was sold on the basis of concessions that became more or less general during the second half of the last quarter. Reports are current that some business has been booked in the last few days at full second quarter prices, but with representative tonnage buyers having anticipated a large part of their nearby requirements, a real test of the market is not looked for until May or perhaps even later.

A Western Pennsylvania alloy steel plant is operating at capacity this week. This, in fact, is true of many of the rolling mills in the Cleveland-Lorain district and also of several mills in the Detroit area. The American Iron and Steel Institute's report for this week, showing 62 per cent of the country's ingot capacity employed, is the most encouraging in six years.

Broader inquiries for cold-finished steel bars are among the week's outstanding developments. One producer has reaffirmed old prices, with the exception of a minor change in delivered prices, outside switching limits, on smaller than carload orders in Michigan. Delivered prices on carbon steel bars for Detroit and "other Eastern Michigan points" are 2.30 cents for carloads and 2.39 cents for less than carloads; to other Michigan points the delivered price is 2.35 cents.

What damage has been caused to steel mill equipment by the floods has been repaired and what slight loss resulted in output has been fully made up for by putting idle equipment into operation. A relatively insignificant amount of re-pickling had to be done to recondition black sheets damaged by flood waters while awaiting shipment.

Pig Iron—Quite a little of the activity in the Middle West pig iron markets this week is ascribed to better interest in offerings on the part of automotive foundries. Contracting for second quarter requirements is becoming more general.

Aluminum—The market is unchanged and steady.

Copper—Consuming demand continues to improve and while predictions of an advance to 9½ cents emanate chiefly from producers, support is given to these forecasts by the much heavier demand for replacement purposes from utility companies in flood-devastated areas. Producers who were still quoting 9¼ cents, delivered Connecticut, early in the week, booked a considerable volume of April business at that level.

Tin—In the expectation that end-of-the-month statistics, when available, will disclose a sharp increase in the world's visible supplies, the market, both here and abroad, has eased off to the extent of about ⅛ cent per pound, spot Straits being quoted at the beginning of the week at 47⅛ to 47¼ cents. Midsummer deliveries were quoted at around 46 to 46¼ cents.

Lead—Quiet and unchanged.

Zinc—Dull and steady.

Caluwaerts Says Car Taxation In Europe Now on Use Basis

The utility value of the automobile is being increasingly recognized in various parts of Europe and taxes are being revised on the basis of use rather than initial puschase, according to Robert Caluwaerts, who recently arrived from Paris and called at the export division of the Automobile Manufacturers' Association.

For many years Mr. Caluwaerts was manager of the Champion Spark Plug Co. of France and until recently sales manager of the equipment division of General Motors of France. He plans to establish an export sales organization at 80 Broad Street, New York, in conjunction with A. E. Whitehouse & Co., Inc.

CALENDAR OF COMING EVENTS

SHOWS

Hungary, Automobile Show, Budapest, Mar.-April

Illinois Automotive Parts Assoc., Maintenance Exhibit, Navy Pier, Chicago, April 4-8

Portugal, Automobile Show, Lisbon, begins April 16

Yugoslavia, Automobile Show, Zagreb, May 2-11

Foundry and Allied Industries Exposition, Detroit .....May 4-9

Spain, Automobile Show, Madrid, May 10-20

International Aero Exhibition, Stockholm, Sweden .....May 15-June 1

International Petroleumn Exposition, Tulsa, Okla. .....May 16-23

Morocco, Fair of Tangiers.....May 16-24

Yugoslavia, 16th International Spring Fair, Lubliana.....May 30-June 11

France, Automobile Exhibit at Foire de Paris .....May

Norway, Automobile Show, Oslo.....May

Olympia Motor Show, London, England, Oct. 15-24

National Automobile Show, Grand Central Palace, New York.....Nov. 11-18

International Aviation Show, Paris, France .....Nov. 13-29

Natl. Exposition of Power & Mechanical Engineering, Biennial Meeting, New York City .....Nov. 30-Dec. 5

International Commercial Motor Transport Exhibition, London, England, November

CONVENTIONS AND MEETINGS

American Chemical Society, 91st Annual Meeting, Kansas City, Mo....April 13-17

S.A.E. Tractor and Industrial Power Meeting, Milwaukee, Wis...April 15-16

American Gear Manufacturers Association, Twentieth Annual Convention, Philadelphia.....April 20-21

S.A.E. Production Meeting, Detroit, Mich. .....April 21-24

Natl. Metal Trades, Annual Meeting, New York City .....April 22-23

U. S. Chamber of Commerce, Annual Meeting, Washington .....April 27-30

American Foundrymen's Association 40th Annual Convention, Detroit, May 4-9

American Petroleum Institute Mid-Year Meeting, Tulsa, Okla..May 13-15

National Battery Manufacturers Association, Spring Convention, Cleveland .....May 20-21

American Iron & Steel Institute, Annual Meeting, New York City..May 21

S.A.E. Summer Meeting, White Sulphur Springs, W. Va. .....May 31-June 6

Automotive Engine Rebuilders Assoc. Annual Convention, Cincinnati, June 1-4

American Society for Testing Materials, Annual Meeting, Atlantic City .....June 29-July 3

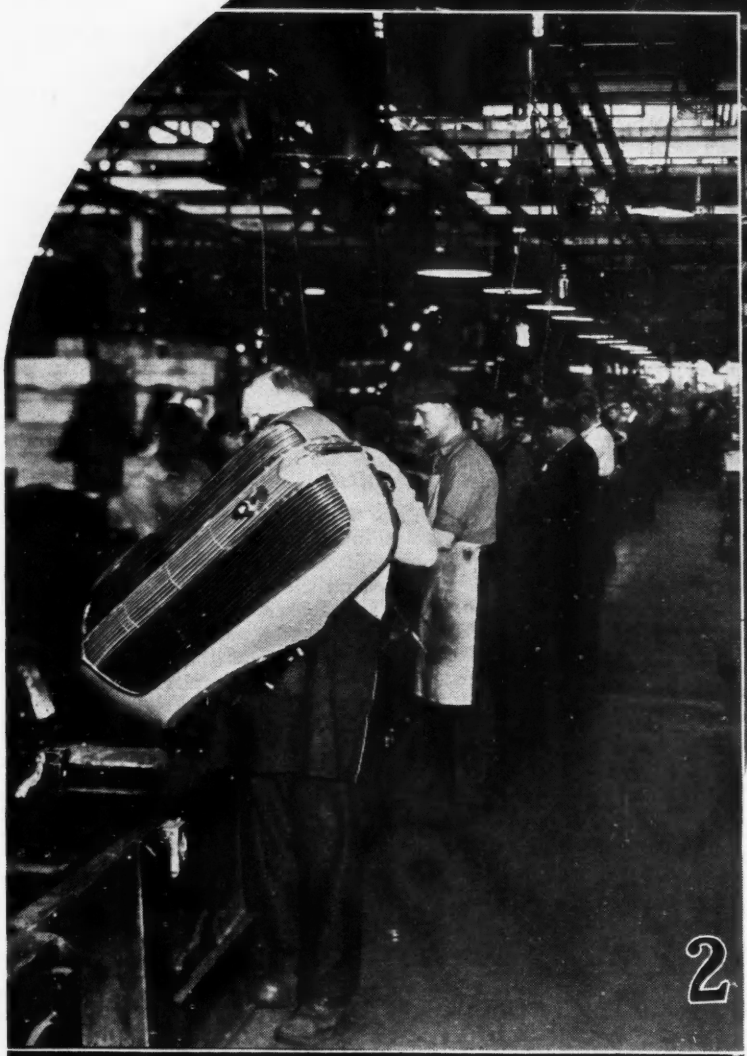
National Association Power Engineers, Annual Meeting, Chicago, Aug. 31-Sept. 4

American Society for Metals, 18th Nat'l Congress, Cleveland, O.....Oct. 19-23

American Gas Association, Annual Meeting, Atlantic City.....Oct. 26-31

American Petroleum Institute, Annual Meeting, Chicago .....Nov. 9-12

Natl. Industrial Traffic League, Annual Meeting, New York City....Nov. 19-20



Down the

UNDER the leadership of P. C. Sauerbrey, vice-president in charge of manufacture, the Plymouth Motor Corp., division of Chrysler Corp., has won recognition as an outstanding member of that small select group which includes the most progressive elements in the automotive indus-

1—Thousand-pound capacity electric hoists lift assembled engines from line and transfer them to the block test conveyor

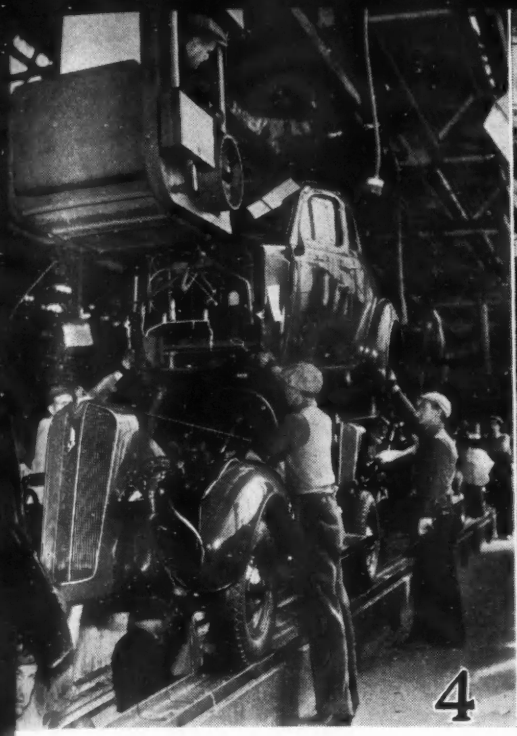
2—Here is the new conveyor line for mounting radiator and shell assemblies. It's really close coupled as you can see

3—Three cars a minute coming off the main assembly lines. At the right is the final O.K. line where Plymouths get the finishing touches

4—Here's the busy cab that transports bodies from the body storage and trim to the final assembly line. Two of these cabs hustle all day long to keep up with the two assembly lines

5—Merry-go-round floor conveyor constitutes the sanding and rubbing deck for fenders in paint shop

6—Giving each car a spin on the floor dynamometer before going to the O.K. lines



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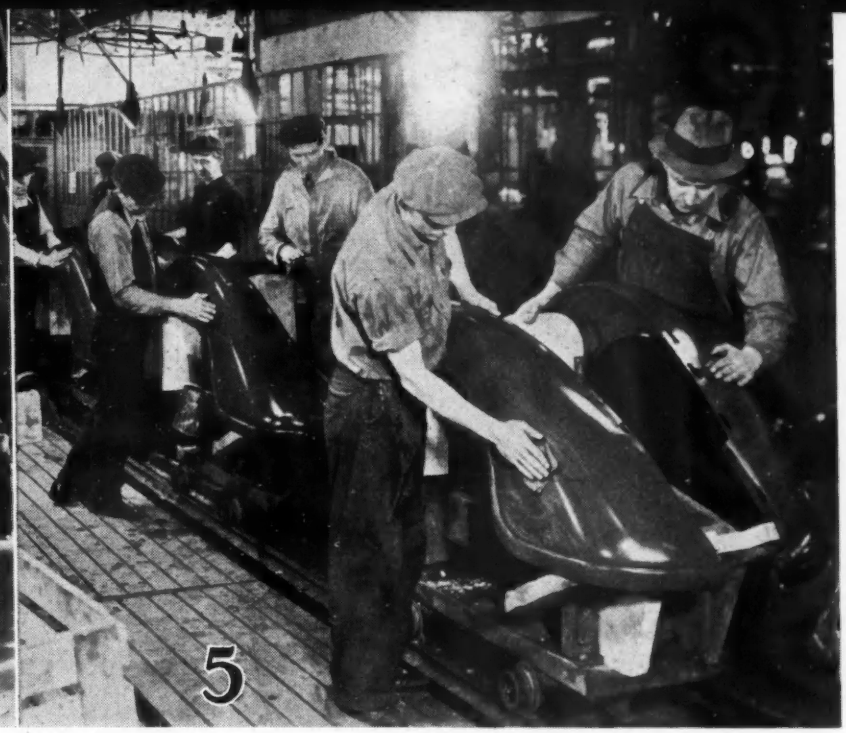

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By Joseph Geschelin

Production Lines at

Plymouth

This is the first of a series of visits to outstanding Automobile Production Lines. In the first issue of each month readers will be taken on an intimate and instructive tour of a factory offering dynamic ideas for the production-minded executive.

try. Certainly from its very beginning, Plymouth has been noted for the dynamic quality of its manufacturing set-up and this has been one of the factors responsible for the amazing vitality of the plant and the organization.

Here under one roof of a building something over one-half mile in length we find concentrated the entire facilities of a plant which is capable of producing upwards of 2500 finished cars per day. And it has been said that Plymouth can show greater dollar volume of business per square foot of factory floor space than any other plant in this country. To the casual visitor, or even the seasoned observer, the complexity of manufacturing departments, and the bewildering array of overhead conveyor lines crossing and criss-crossing, dipping and rising, present a picture too difficult to resolve or rationalize.

Consequently, it is our purpose to present a brief perspective of this plant by touching upon certain high spots which in themselves are indicative of the activity and objectives of the set-up.

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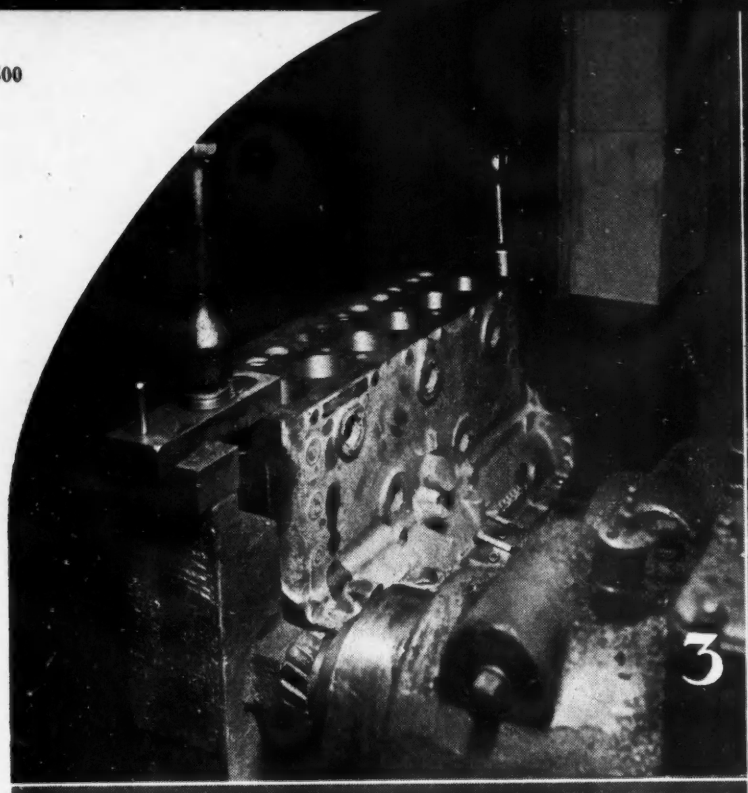
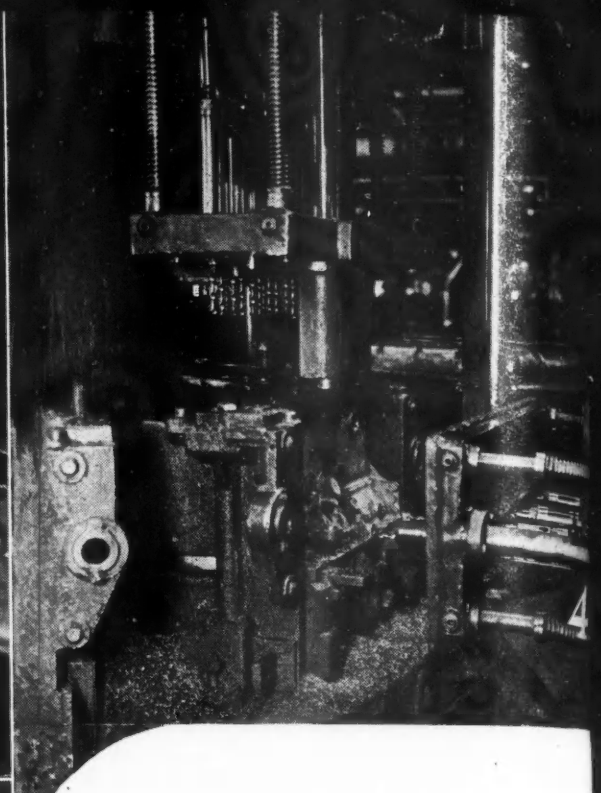
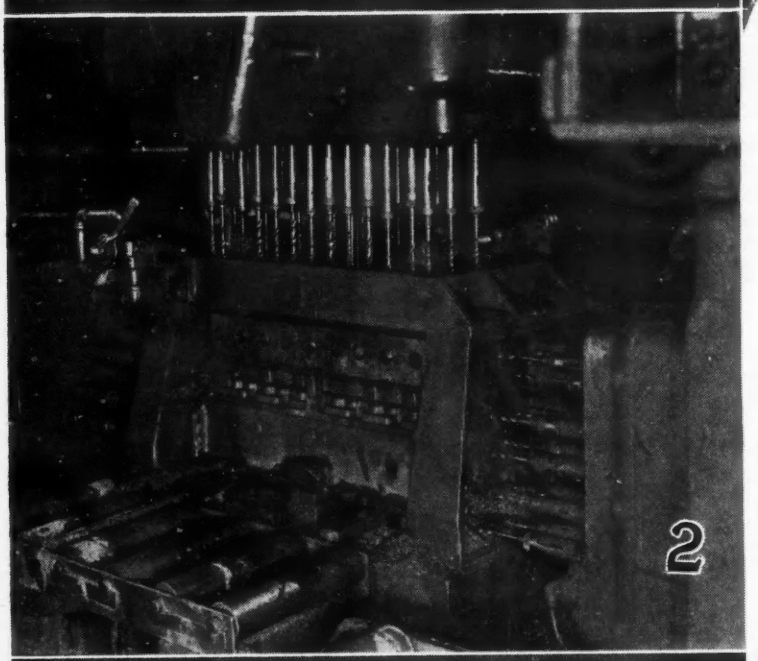
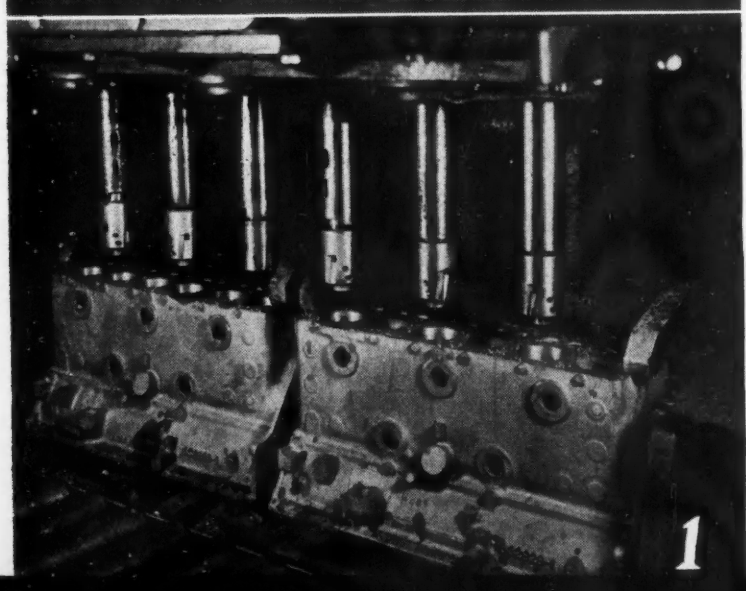








The main plant in Detroit is designed to manufacture complete vehicles and the major component parts under the one roof and in addition produces the component parts which are used in the Plymouth assembly plants in Los Angeles and Evansville. One of the recent additions to the facilities in Detroit was the new car storage depot providing space for 5000 cars—one of the largest open air parking lots in the world.

1—Rough-boring cylinders on Putnam six-spindle machine with spindles spaced to enter alternate bores.

2—Close-up of Foote-Burt three-way drilling machine which drills 110 holes in one setting, in top and sides of cylinder block.

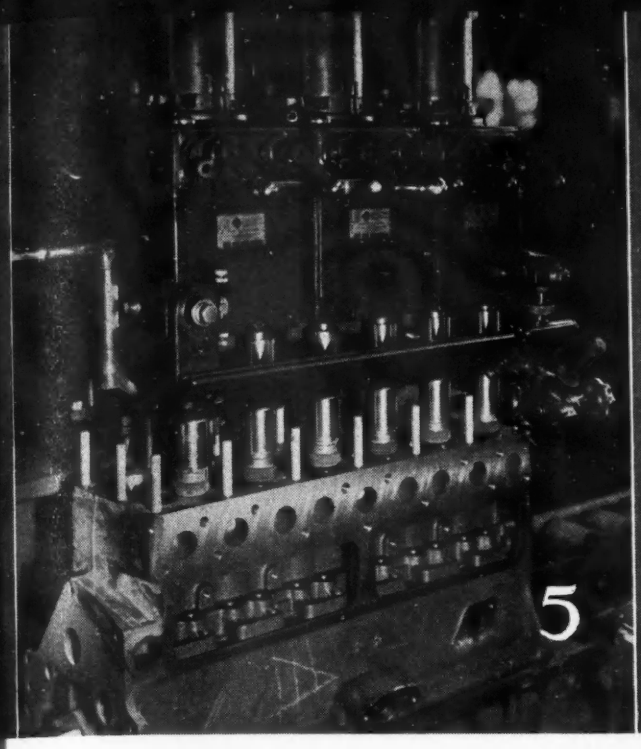
3—Milling generator bosses and relief valve pad on 48-in. Cincinnati two-spindle wide bed milling machine.

4—58 holes in two blocks are drilled at a time in this Natco Center Column combination drilling machine. It drills all valve and tappet holes on the top side and all holes in oil filler side.

5—Grinding valve seats on Hall grinder at the rate of 90 blocks per hour.

6—Drilling 12 angular holes in valve tappet bosses and chamfering top of valve tappet holes. Baush two-way all-electric unit drilling machine.

7—Rough and finish-milling top surface of block on V-4 Newton four-spindle rotary mill. Tooling consists of Ingersoll milling cutter bodies with inserted Stellite-tipped blades.



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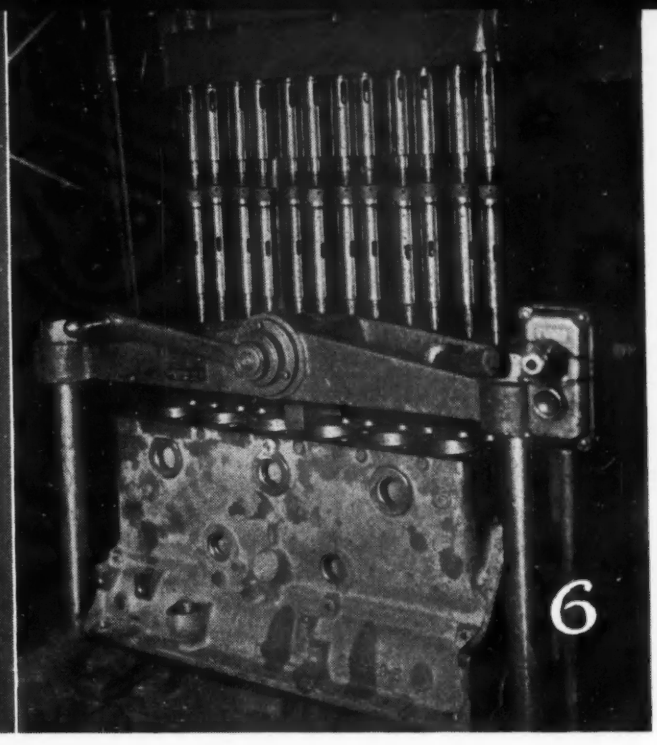

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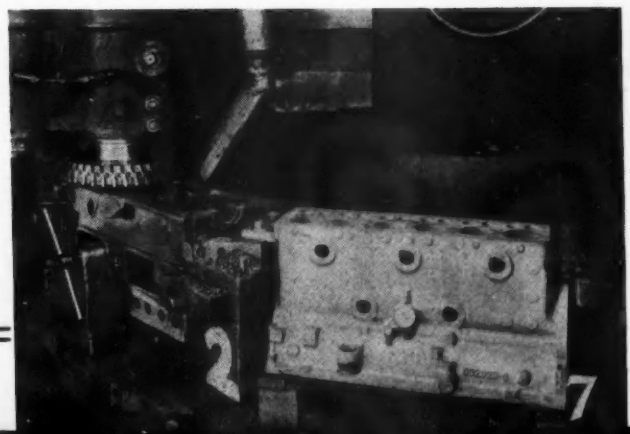
Table 1—Sequence of Operations on Plymouth Cylinder Block

Operation	Equipment
Assemble to cylinder block (12) valve stem guides.	25-ton Oil Gear Power Press. No. 207-B Toledo Double Crank Press.
Ream holes in valve stem guides.	15½ Foote Burt Drill Press.
Finish bore intake throat holes. C'bore exhaust seat to depth.	15½ Foote Burt Drill Press.
Finish c bore exhaust insert seat to diameter. Blow out with air.	15½ Foote Burt Drill Press. Hood Built-in Conveyor.
Assemble exhaust valve seats and press into block part way.	Conveyor.
Finish seat exhaust valve seat. Roll exhaust valve seat in place.	Conveyor.
Chamfer bottom of cylinder bores. Drill No. 12 angle hole in front cam bushing.	21-in. Cinn. Drill Press. No. 3 Avey Drill Press.
Drill, redrill and c'sink holes in bottom and manifold side.	15½-D Foote Burt Drill Press. Avey Drill Unit and Lewis Allis Dr. Unit.
C'sink ¼ in. pipe tap holes in bottom of block, oil pressure relief valve hole and oil line hole.	Natco Center Column Drilling Machine.
Semi-finish bore cylinder bores.	Conveyor—Air Motor. Ingersoll 6-Spdl. Boring Machine.
C'sink all holes on top, front and rear end and chamfer top of cylinder bores.	Fox 2-Way Horizontal Drill. 15½ Foote Burt Drill Press.
Tap all holes in top and bottom.	Greenlee 2-Way Tapping Machine.
Tap all holes on top and both ends.	Natco 3-Way Tapping Machine.
Tap all holes on bottom and both sides.	Natco 3-Way Tapping Machine.
Tap holes in manifold side and oil filler side.	Greenlee 2-Way Tapping Machine.
Tap all holes in front and rear ends.	Greenlee 2-Way Tapping Machine.
Retap main bearing stud holes. Flush out chips.	Hammond Radial Drill Press. Plymouth Special Washing Machine.
Assemble bearing cap studs.	Size CSB Ingersoll Rand Air Motor.
Loose assemble bearing caps and nuts.	Conveyor.
Tighten crankshaft bearing cap Nos. 1, 2, 3, 4, and nuts.	Size CCS Ingersoll Rand Air Motor.
Core drill, rough and finish bore crank and cam holes. C'bore welch plug hole in rear and front ends.	Natco 2-Way Horiz. Comb. Drill. Mach.
Finish line ream crank and cam holes.	Size BSE Ingersoll Rand Air Motor.
Mill oil pump and fuel pump bosses.	48-in. Cinn. Auto. Mill.
Rough mill oil slinger groove. Chamfer bearing and chamfer 2 11/16 in. dia. Drill (1) 3/16 in. hole.	48-in. Cinn. Auto. Mill with Spec. Snyder Head.
Finish straddle face thrust bearing faces on rear crank bearing.	24-in. Cinn. Mill with Eccentric Head. Leland & Gifford Units.
Finish mill rear end.	24-in. Cinn. Special Milling Mach. with Eccentric Head. Newton Planer Type Mill. 48-in. Cinn. Milling Machine.
Drill, c'bore, ream and spot-face distributor hole and oil pump holes. Drill, C'sink and tap attaching screw holes.	Natco 2-Way Drill & Tapping Machine.
Drill and ream transmission dowel holes. Drill cam bearing lock holes and ream oil pressure relief valve hole.	Spec. Snyder 2-Way Drilling Machine.
Inspect distributor hole, rear dowel holes and oil pressure relief valve hole. Flush out chips.	Bench. Plymouth Special Washing Machine.
Machine intake valve seats. Assemble cylinder head studs. Drive cylinder head studs. Finish bore cylinder bores. Rough lap cylinder bores.	No. 2 Avey Drill Press. Conveyor. Conveyor. Ingersoll 6-Spdl. Boring Mach. No. 214 Barnes 6-Spdl. Honing Machine.
Finish lap cylinder bores	No. 214 Barnes 6-Spdl. Honing Machine.
Rinse and cool. Inspect bore size and finish. Wash. Grind intake valve seats.	Kleen-Ez Washer. Conveyor. Kleen-Ez Washer. Hall Valve Seat Grinders with Overhead Trolley.
Inspect valve seats. Grind exhaust valve seats.	Conveyor. Hall Valve Seat Grinder with Overhead Trolley.
Inspect.	



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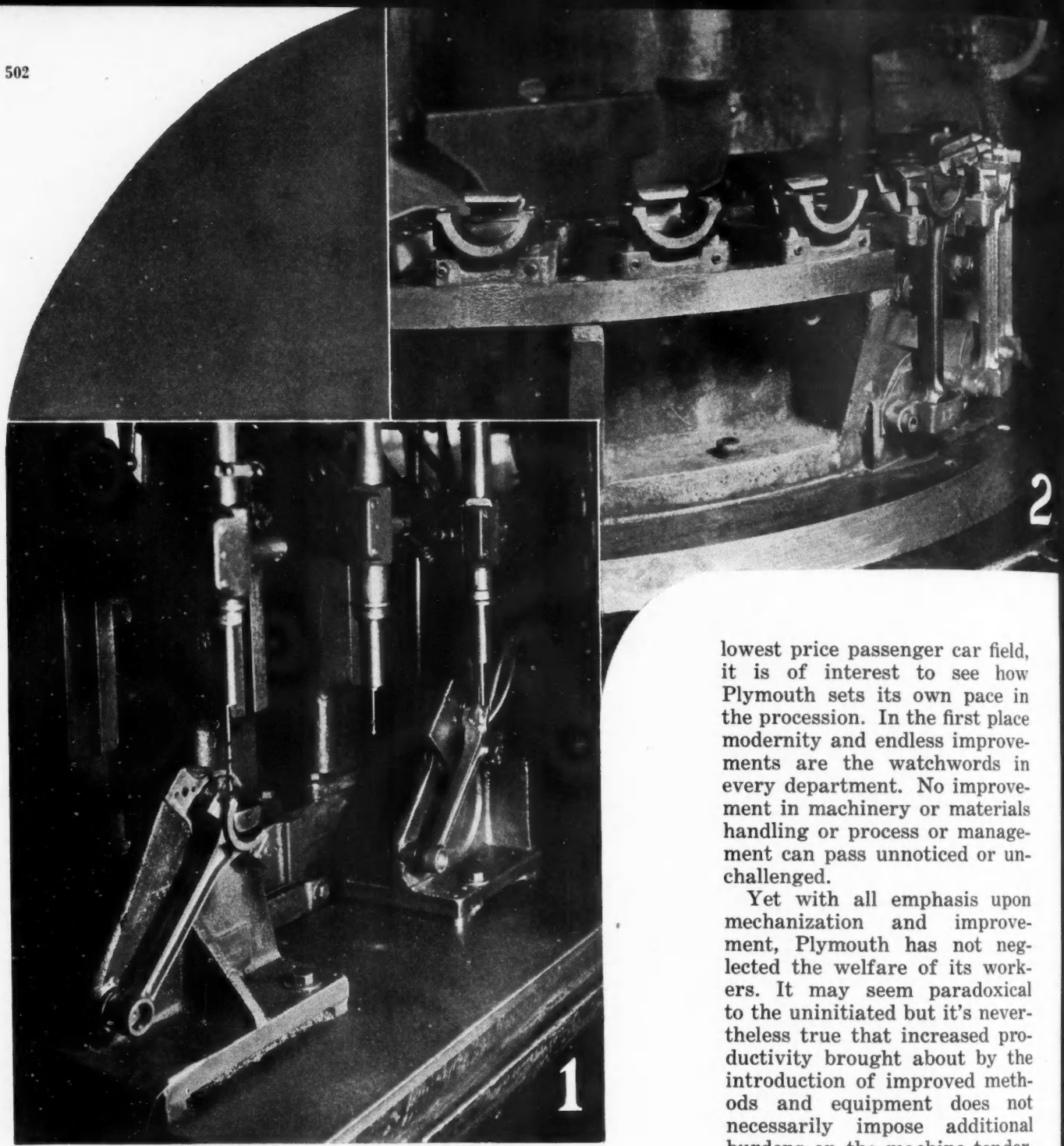


1. Three-spindle Edlund drill press set up to drill angular oil holes in Nos. 1, 3 and 5 rods.

2. Blanchard two-spindle vertical surface grinder is used to grind joint face of rods and caps. Table fixtures hold 12 rods and 12 caps

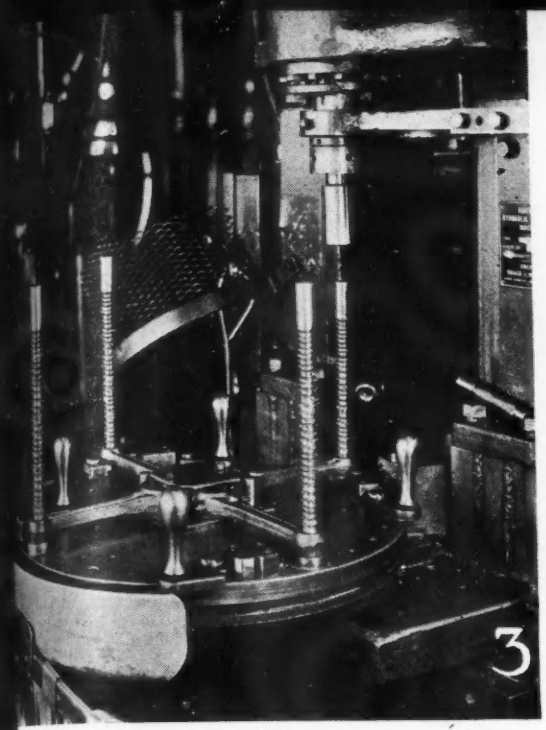
This solves the usually troublesome problem of handling specification options and spotting carload lot shipments, since an entire day's output can be driven into the depot without interrupting the normal flow of production activity.

This depot works on the cross-flow principle. Close to 4000 cars may be found on the lot during the course of a day—2000 being spotted for shipment, and another 2000 flowing off the lines. In addition, the factory has a service station fully equipped to provide a complete preparation for drive-away cars.

Considering the caliber of the competition which exists in the lowest price passenger car field, it is of interest to see how Plymouth sets its own pace in the procession. In the first place modernity and endless improvements are the watchwords in every department. No improvement in machinery or materials handling or process or management can pass unnoticed or unchallenged.

Yet with all emphasis upon mechanization and improvement, Plymouth has not neglected the welfare of its workers. It may seem paradoxical to the uninitiated but it's nevertheless true that increased productivity brought about by the introduction of improved methods and equipment does not necessarily impose additional burdens on the machine tender. As a matter of fact the new equipment makes his lot much easier by relieving him of most of the manual labor involved in the handling of work and manipulation of controls.

And along this line it may be noted that Plymouth probably was one of the very first to install the fresh atmosphere paint spray booths which make it possible for men to work on the job all day without the use of masks or other burdensome protective devices. The spray booths used here are the now well-known Mahon Hydro-Filter downdraft units.



3 — 5-ton American hydraulic broach finishing wrist pin hole

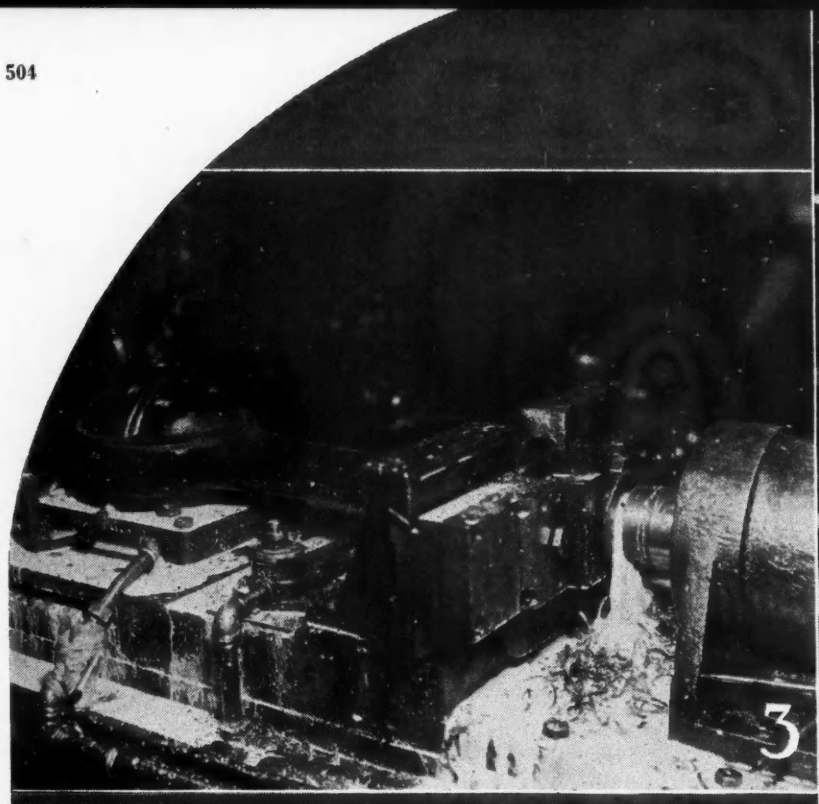
It is no new experience for the writer or any one else who frequents this plant to find new items of machinery or new processes in experimental production long before these ideas have spread out to the trade in general. As this article is being written, E. J. Hunt, master mechanic, is installing trial machines that bid fair to create a stir when they swing into regular production. It reminds us of the hectic days barely a few years ago when Plymouth startled the industry with the first production installations of surface broaching equipment. During the course of the first year it was a common sight to find every make of surface broaching machine then on the market crammed into the connecting rod and bearing department, doing its share of the day's work. Little by little this brought out the good points or the weaknesses of each one and finally resulted in the healthy development of some of the broaching machines which are noted elsewhere in this article.

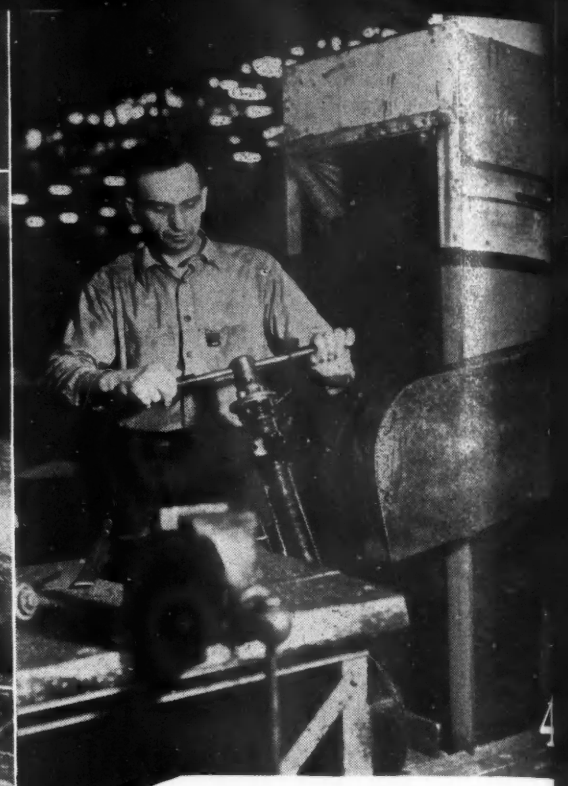
Without going into much detail on the factory layout, we may note that all raw materials enter the loading docks extending the full length of the building on one side, pass on to the different manufacturing departments on the floor, and emerge as components of chassis units which move to the final assembly lines along the opposite side. Materials handling has been worked out in marvelous fashion, with practically all feeder lines traveling on overhead monorails. The maze of these overhead lines simply defies description since at first glance one is bewildered by the kaleidoscope of moving sheet metal, wheels, engines, chassis frames, lamps, batteries, and all the rest. But there is a precise order to the movement of these parts because by virtue of the guiding hand of the planning department every part on every line is moving to its destination and reaches that point in time to match corresponding parts that feed the assembly line for the building of a specific car.

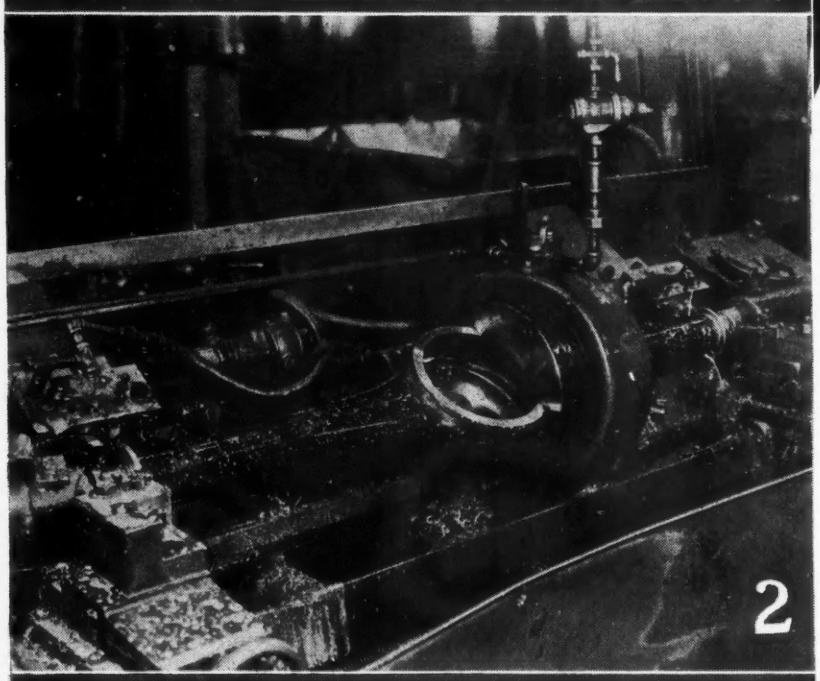
Following the practice pioneered in automobile plants, manufacturing departments for each unit are concentrated at convenient points in conjunction

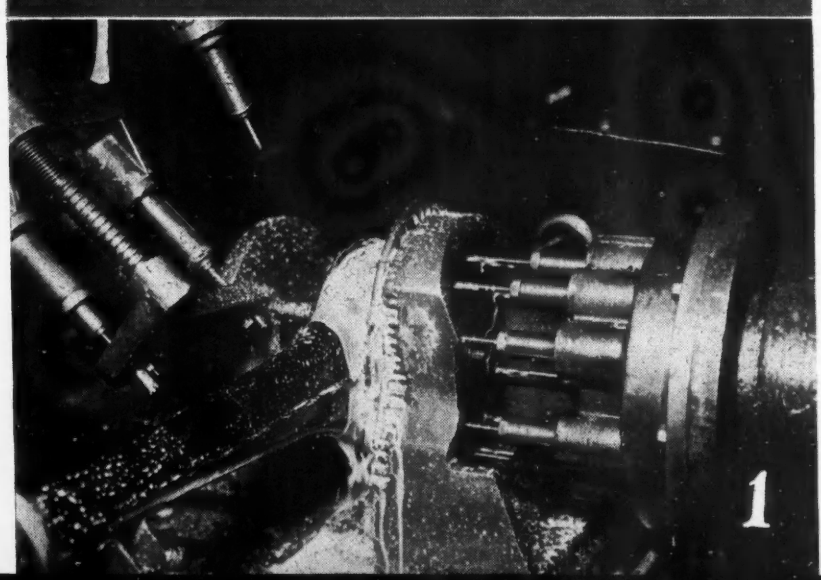
Table 2—Sequence of Operations on Plymouth Connecting Rod Assembly

Operation	Equipment
Loose assemble to (1) Connecting Rod.	Bench.
(1) Connecting Rod Bearing Cap.	
(2) Bolts. (2) Nuts.	
Drive down nuts.	Metalwood 2-Spdl. Adjustable Nut Driver.
	Baush 2-Spdl. Adj. Nut Driver.
Rough grind one face of Crank End and one face of Wrist Pin End in line.	16-A Blanchard Auto. Grinder.
Drill and ream crank hole.	50-H Baker Drill Press.
Chamfer both sides of crank hole.	Rockford 2-way Chamfering Machine.
Finish grind both sides of crank end.	No. 16-A Blanchard 2-Spdl. Vertical Surface Grinder.
Broach large end.	No. 3 American Horiz. Double Spdl. Rack Type Broaching Machine.
	No. 3 LaPointe Double Spdl. Horiz. Broaching Machine.
	American Horiz. Double Spdl. Broach.
Lap crank hole.	No. 204 Barnes Single Spdl. Hydraulic Honing Machine.
Inspect.	
Center small end.	No. 3 Avey Drill Press.
Finish ream Wrist Pin Hole.	No. 2-B 3-Spdl. Edlund Drill Press with three power feeds.
	No. 2-B 4-Spdl. Edlund Drill Press.
Assemble (1) Bushing.	V-1 American Hyd. Broach.
	2-Ton American Vert. Hyd. Broach.
Countersink 60° and drill 7/32 in. hole thru Wrist Pin End.	No. 3 Avey Drill Press.
	No. 3 Leland & Gifford Drill Press.
Mill locating spots on side of Wrist Pin Hole.	18" Cinn. Mfg. Mill.
Chamfer both sides of bushing.	No. 3 Avey Drill Press.
Burnish bushing.	8-Ton General Flex. Power Press.
	2-Ton American Vert. Hyd. Broach.
Diamond bore Wrist Pin Hole.	Excello No. 216-A Double End Diamond Boring Machine.









with the assembly or sub-assembly conveyor line for the unit. Obviously, in a plant of Plymouth's proportions only a few of these stations can be located adjacent to the final line, but that's no drawback since the delivery of finished units is handled by the overhead feeder lines. However, wherever possible sub-assembly stations are located directly at the point of usage.

Just to hit the high spots, Plymouth builds the complete engine including cylinder block, crankshaft, connecting rods, pistons, heads, etc.; gas tanks; rear axles; and many sub-assemblies including gas lines, wiring harness, etc. All sheet metal parts —fenders, splashers, radiator

1—Two-way Barnes drilling machine with Milholland units set up for drilling ten holes in banjo face and drilling four other holes in the housing.

2—15x60″ Sundstrand double-end lathe used to turn face and chamfer flanges on both ends

3—Rough bore and chamfer both ends on two-way Barnes boring machine

4—Bottom of large bore at both ends is chamfered with hand tool. Then housing is loaded into Blakeslee washing machine in the background.

Automotive Industries

5—As first operation, axle housing is straightened on 20-ton Flexible power press

shells, hoods, etc., are cleaned, rust proofed and then finished in synthetic enamel in the plant. Bodies come in from the outside already trimmed and painted, but exterior hardware and finishing operations including striping and polishing are handled here.

Bodies are prepared for the assembly lines on two short conveyors and are fed to the final assembly by trolley lifts which hoist the body to ceiling level and then deliver it over to the line.

Since it is impractical to cover the manifold activities of this plant within the narrow confines of any article or even a book, we have chosen to high spot some of the more important departments pictorially rather than by detail description. In the comprehensive selection of factory views accompanying this article will be found close-ups of tooling and general shots of the following activities:

1—General views of assembly lines and other scenes.

2—Selected materials handling conveyors.

3—New piston production line.

4—Connecting rod production.

5—Cylinder block production showing new items of equipment.

6—Rear axle housing machining.

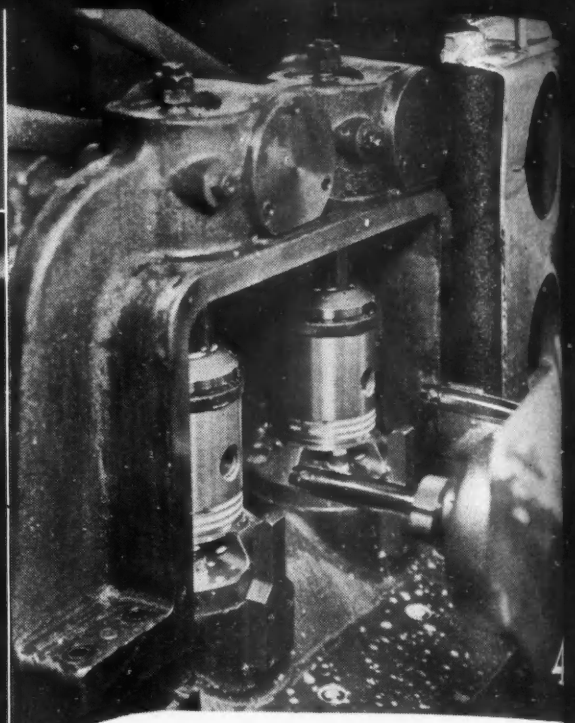
7—Surface broaching operations.

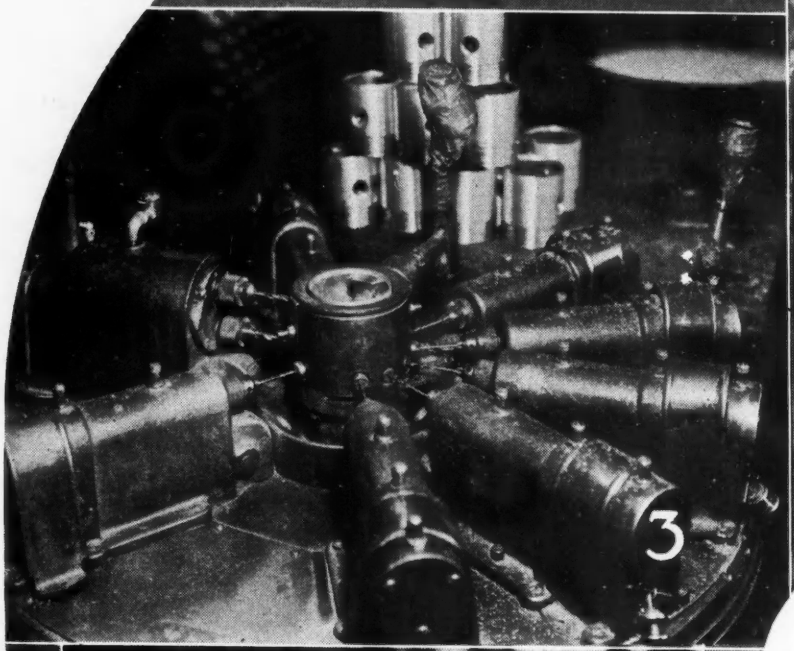
Consider first the materials handling system since it forms the very backbone of the manufacturing scheme. As we mentioned earlier, the movement of raw and finished parts and units is handled mainly on overhead monorail lines. Sub-assemblies and final assembly lines move on floor level conveyor chains of the usual types while the movement of heavy parts such as the cylinder block is facilitated by roller conveyor lines linking the machines in a given department.

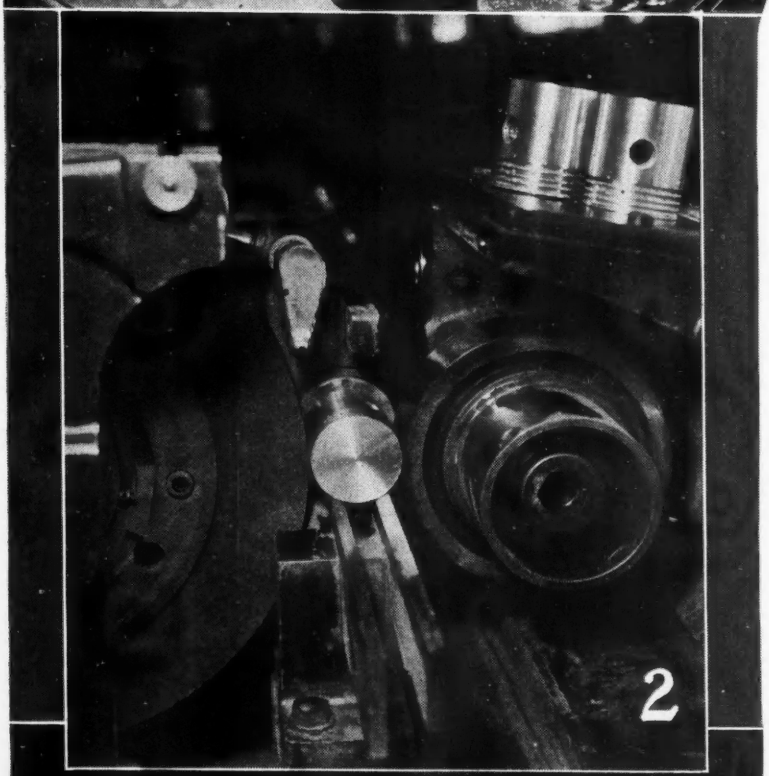
Electric hoists are used in the transportation of heavy units such as the engine while bodies are carried by an overhead crane. The well-known Curtis air hoist has been found to be of great utility in moving fairly

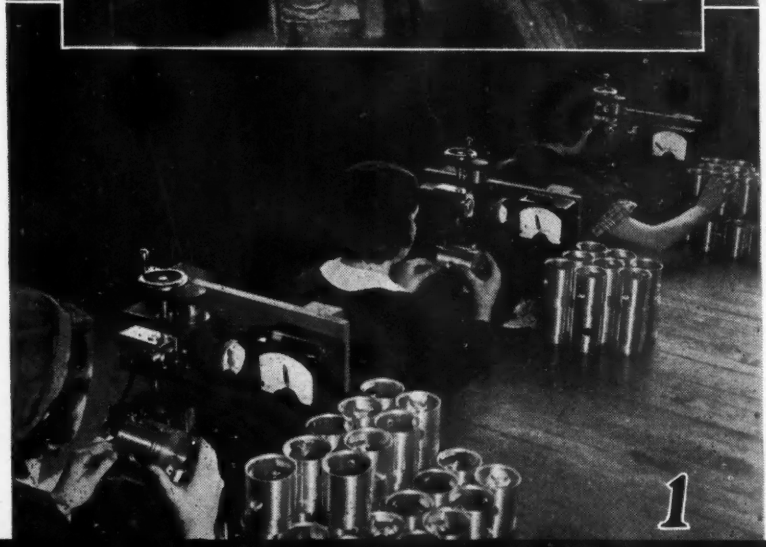
Table 3—Sequence of Operations on Plymouth Rear Axle Housing Assy.

Operation	Equipment
Inspect.	Floor.
Straighten.	20-ton Flexible Power Press.
Rough bore and chamfer both ends.	2-way Barnes Boring Machine.
Straighten.	20-ton Flexible Power Press.
Machine banjo face.	No. 216 Baker Drill Press. No. 321 Baker Drill Press. No. 217 Baker Drill Press. No. 422 Baker Drill Press.
Turn, face and chamfer flange—both ends.	15x60 Sundstrand Double end Lathe.
Drill (10) holes in banjo face and drill (2) ¼-20 holes and (1) 21/64 hole for ⅛ Pipe Tap Drill (1) 11/32 hole for ⅛ Pipe Tap.	2-way Barnes Drilling Mach. Milholland Units. 2B Edlund Drill Press. (1) Detroit Bronze Bushing Co. 2½x10" Cyl. Pneumatic Feed Equipment with Auto valve for Mach. B-3903.
C'sink all holes.	Floor stand.
Drill (2) ⅛ Pipe Tap holes in bearing ends.	Milholland units.
Tap (2) ⅛ Pipe Tap holes in bearing ends.	Special Base with No. 4P Cinn. Tapper.
Tap 7/16-20 hole.	21" Cinn. Drill Press.
Tap (10) holes in banjo and (2) ¼-20 holes and (1) ⅛ pipe tap hole (1) ⅛-27 Straight Pipe Tap.	Greenlee 2-way tapping mach. 2-B Edlund Drill Press. Milholland Units.
Countersink holes on inside of banjo face.	Floor Stand.
Broach flat on flange (both ends).	V-34 American Spec. Duplex Broaching Mach.
Semi-finish and finish ream ends.	Barnes 2-way Boring Mach.
Drill and ream (5) holes in flange (both ends).	Barnes 2-way Drilling Mach.
Burr all holes in flange.	No. 1 ULB Thor Universal Electric Drill with NA-167 right angle attachment. Ingersoll Rand Air Drill No. 33 and No. 174.
Wire brush inside of housing.	Floor.
Hand chamfer bottom of large bore & load Washing Mach.	Floor.
Wash.	No. 90-P Blakeslee Washer.
Clean inside of banjo.	Bench.
Inspect.	









heavy parts and is an important piece of equipment at various points in the cylinder block machining department; also at the washing tanks.

In the Plymouth plant you will find some of the longest monorail conveyors in the automotive industry and as a concrete illustration of this statement we give below the actual lengths of some of the many lines:

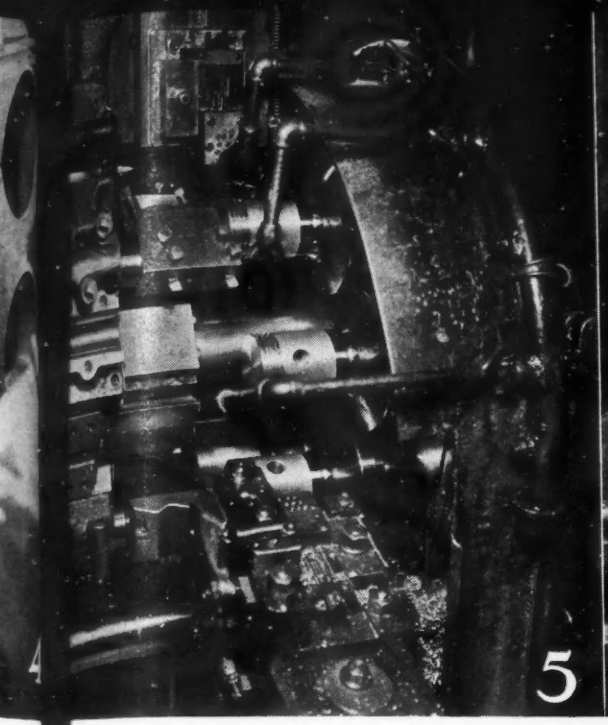
Description	Developed Length in Ft.
Rear fender	1204
Hood storage	2043
Fender and splasher Bonderize line	647
Chassis and final line	1201
Engine assembly	760
Engine distribution	1400
Frame	1439
Axle delivery	968
Motor parts delivery	1128
Gas tank delivery	965
Tire conveyor	796
Battery delivery	1088
Black enameled sheet metal	3800

1—Gaging and sorting piston for diameter with electric amplifying gages.

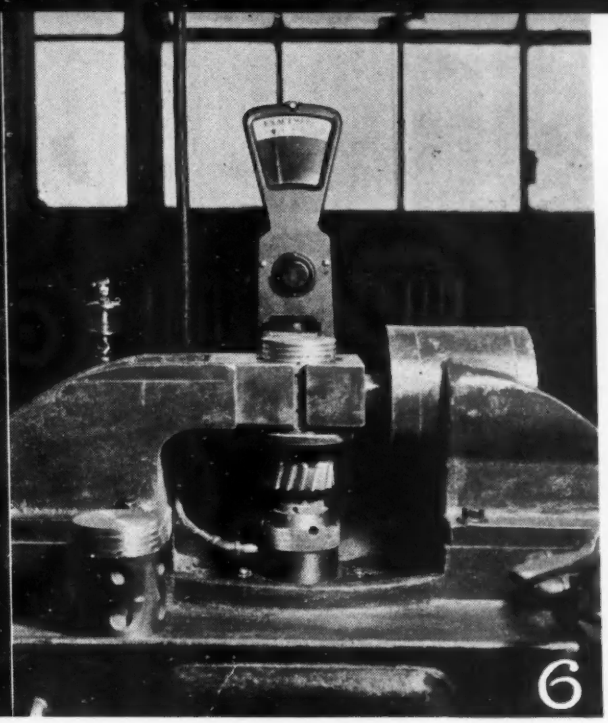
2—Looking into the heart of a No. 2 Cincinnati centerless used to rough cam grind piston O.D.

3—Drilling nine holes in one setting on 9-spindle Kreuger horizontal driller.

4—Ex-Cell-O double end Jr. precision boring machine used to rough bore and diamond finish wrist pin hole.



5—Turning O.D., ring grooves, face and chamfer on 7-in. six-spindle Baird automatic chucking machine.

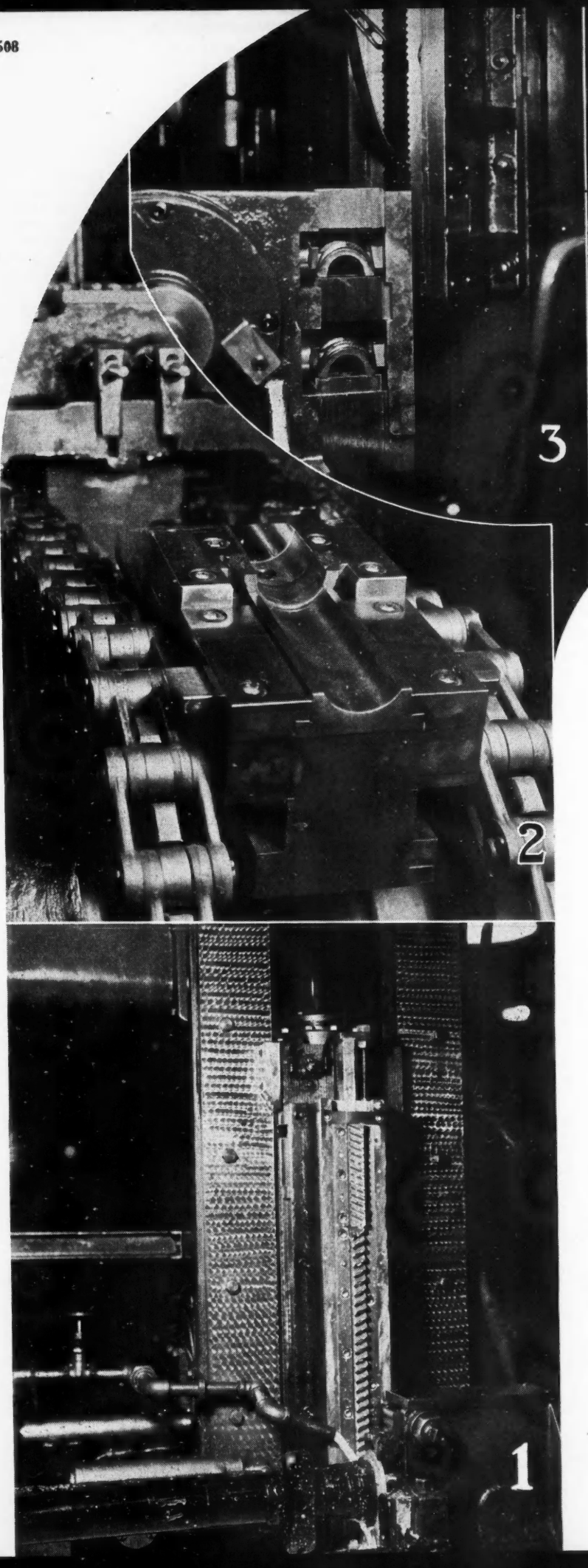


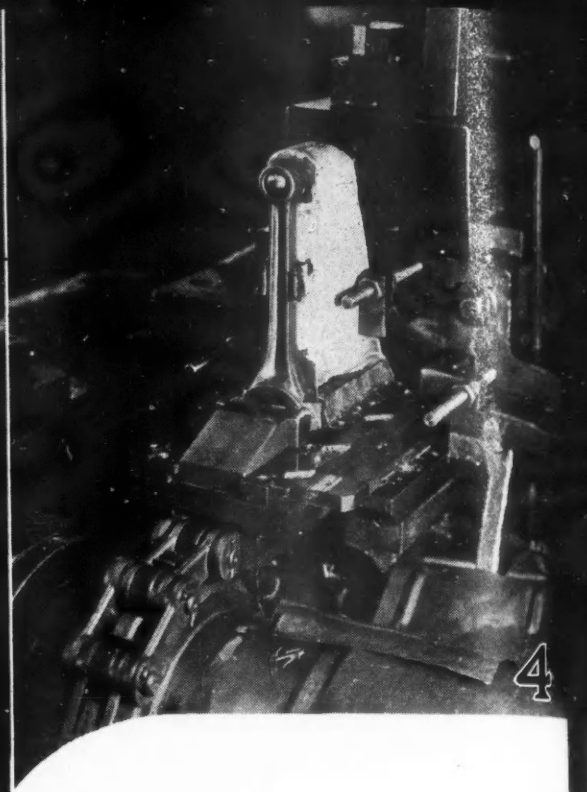
6—Special Snyder machine designed to produce pistons to exact common weight specification. Milling cutter shown below cuts required amount of material from weight bosses in lower end of skirt.

Cylinder block machining which was described completely in AUTOMOTIVE INDUSTRIES at the time when the new equipment was installed, has been relocated and largely expanded to take care of increased production. The major items of machinery remain unchanged but we have selected a large group of close-ups which show the fixtures and tooling rather effectively. The sequence of major operations is shown in Table 1. However, the cylinder block group does have several significant pieces of equipment representing the very last word in their line. The first of these is the Hall valve seat grinder. It is the first installation of an

Table 4—Sequence of Operations on Plymouth Piston

Operation	Equipment
Inspect Casting.	
Bore face and chamfer open end.	LeBlond Lathe.
Core drill, drill and chamfer Wrist Pin Hole.	Snyder Spec. 2-way Drilling Mach.
Undercut wire retainer groove and ream wrist pin hole.	
1st Station: Load (2) pieces.	
2nd Station: Core drill, drill and chamfer wrist pin hole.	
3rd Station: Undercut wire retainer groove in wrist pin hole.	
4th Station: Ream wrist pin hole.	
Turn O. D. Turn Ring Grooves. Face and Chamfer head end and lands.	7" 6-spdl. Baird Chucking Machine.
Chamfer O. D. at open end.	
Station No. 1: Load.	
Station No. 2: Rough turn O. D. half way. Rough groove ring grooves.	
Rough face Head End.	
Station No. 3: Second rough turn O. D. of Head End.	
Rough turn O.D. of skirt all way.	
Station No. 4: Finish face head end. Chamfer ring grooves. Turn radius on head end. Turn 20° angle at top of skirt. Chamber bottom of skirt.	
Station No. 5: Semi-finish—turn head end and skirt.	
Station No. 6: Finish turn ring grooves and finish chamfer 20° angle on lower groove.	Bench
Station No. 6: Finish turn O. D. of head and skirt.	
Inspect.	
Drill (7) ⅛ holes and (2) 7/32 holes.	Kreuger 9-spdl. Horiz. Drilling Machines.
Drill (12) ⅛ holes in 3rd ring groove.	Ex-Cell-O 12 - spdl. Drilling Machines.
Drill (4) 5/32 holes thru wrist pin bosses.	No. 2' 15" Avey Heavy Duty Drill Press. No. 2B Edlund Drill Press.
Saw horizontal slot.	Snyder Spec. Double Head Rotary Slitting Machine.
Saw slot in skirt.	No. 2 Cinn. Centerless Grinder.
Rough cam grind O.D.	No. 2 Cinn. Centerless Grinder.
Finish cam grind O. D.	Bench.
Burr lower ring grooves.	
Rough and finish diamond bore wrist pin hole.	Ex-Cell-O No. 1212 Double End Jr. Precision Boring Mach.
Inspect wrist pin hole.	Bench.
Wash in gasoline, blow out with air.	Tank.
Weigh and machine to common weight.	Spec. Snyder Mach. — Exact Weight Spec. Piston Scale.
Inspect and grade for size and mark.	No. 12 Martin Hydraulic Marking Machine. Bench—Toledo Scale — graduated 1/100 lbs.
Oxidize.	Tanks.
Final inspect.	





automatic six-spindle grinder for hard valve seats and it can handle about 90 blocks per hour. The other is a Cincinnati surface broaching machine for bearing locks and is intended to replace the first machine ever built for this purpose which was installed at Plymouth almost four years ago. Both machines are going on the line as this article is being written.

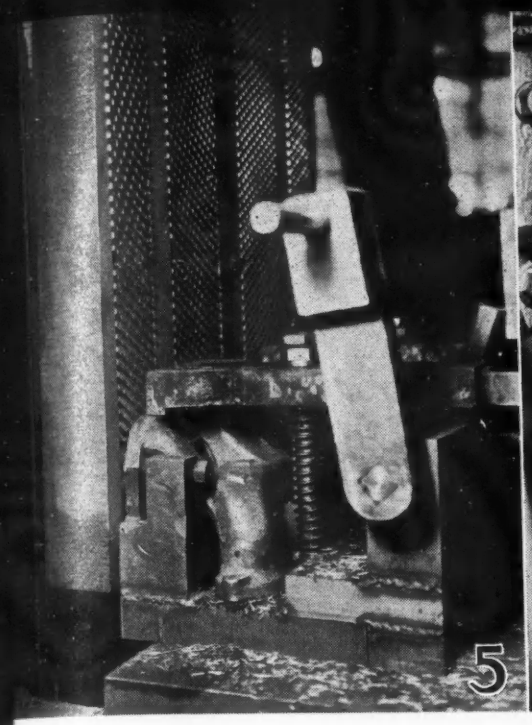
The connecting rod machining line may be considered as a new department since it has been rearranged entirely and now incorporates such equipment as proved satisfactory in early experimental production. This applies particularly to the surface broaching machines most of which are pictured and described in this article. The sequence of major operations is shown in Table 2.

1. Flats and bevels on end flanges of rear axle housing produced by surface broaching on 34 Duplex American Broaching machine handling both ends simultaneously

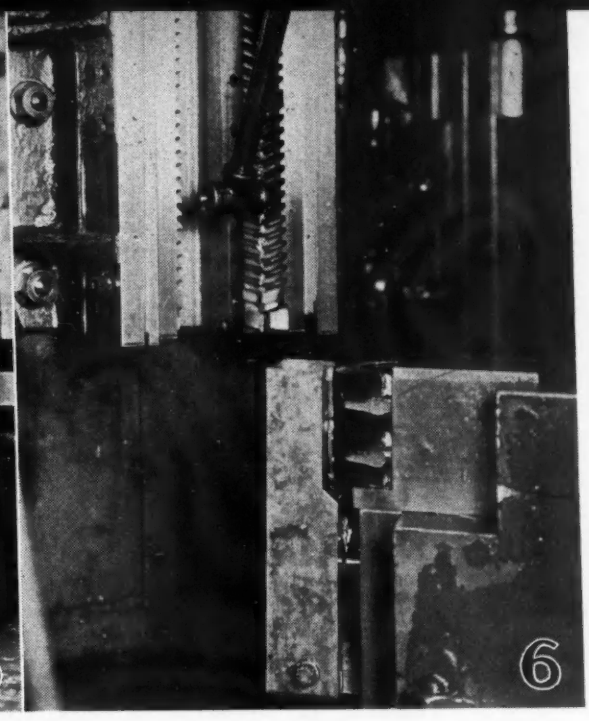
2. Connecting rod and cap joint face and radius finished by surface broaching on this 70-in. continuous horizontal Foot-Burt machine

3. Bearing faces of connecting rod caps finished by surface broaching handling two caps at a time. One of the machines used for this operation is a 12-ton Oilgear sideplate broach

4. Connecting rod and cap boss sides and faces formed by surface broaching on this 60-in. Foot-Burt continuous horizontal broaching machine



5—Broaching four manifold pads simultaneously in this set-up, using broach holder with four individual broaches.



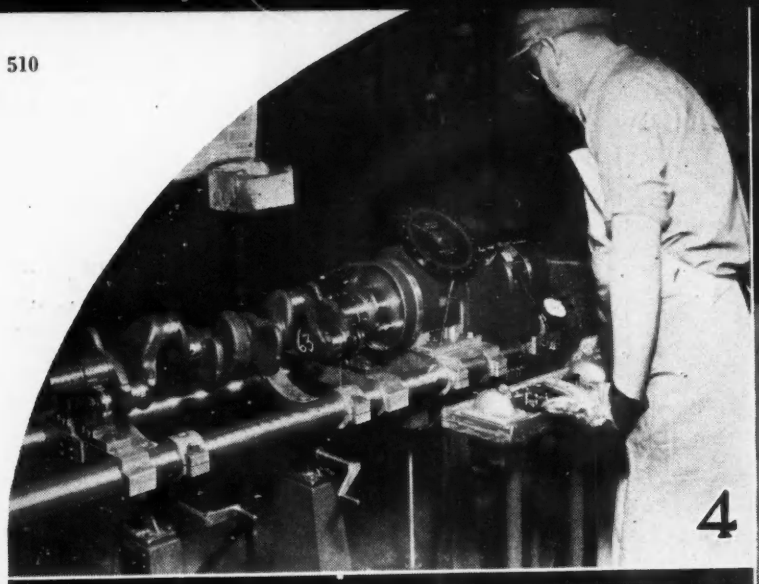
6—Broaching sides of bolt bosses and locating spot on back of cap, two caps at a time. Equipment is a No. 5-42 Cincinnati Duplex vertical hydraulic broach.

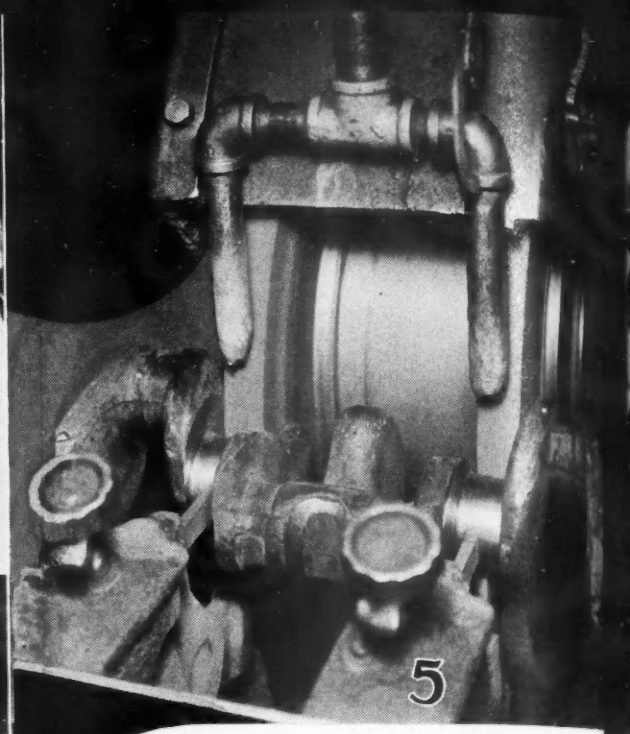
Machining of the banjo rear axle housing includes a number of really interesting operations, not the least of which is the surface broaching of flats on the end flanges. Some of the operations shown here probably have not been described before. The sequence of major operations is shown in Table 3.

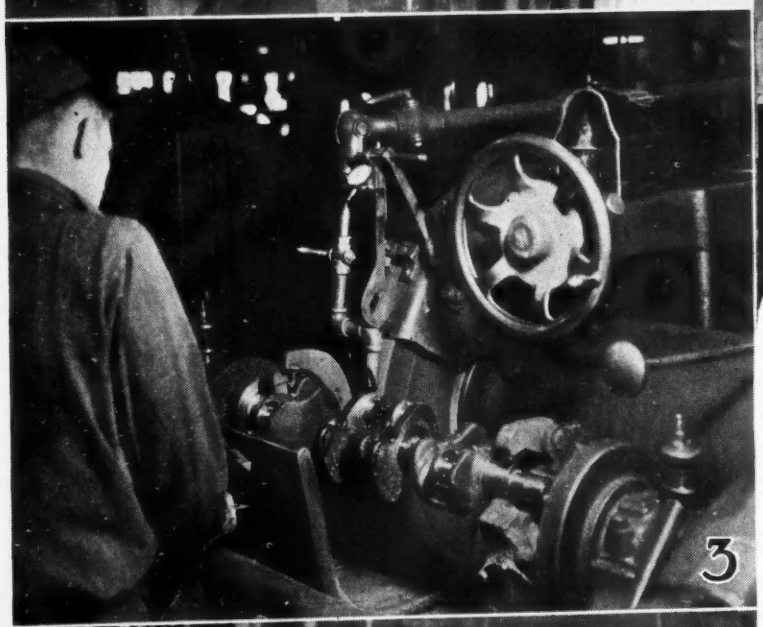
Piston manufacture has been placed on a new plane in the

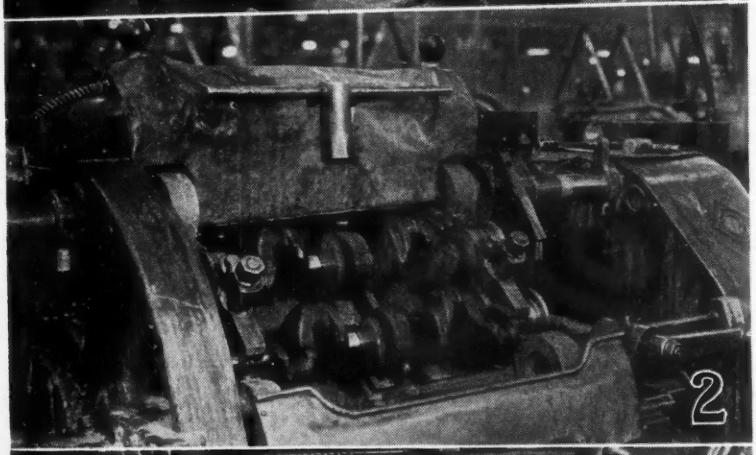
Table 5—Details of Plymouth Surface Broaching Applications

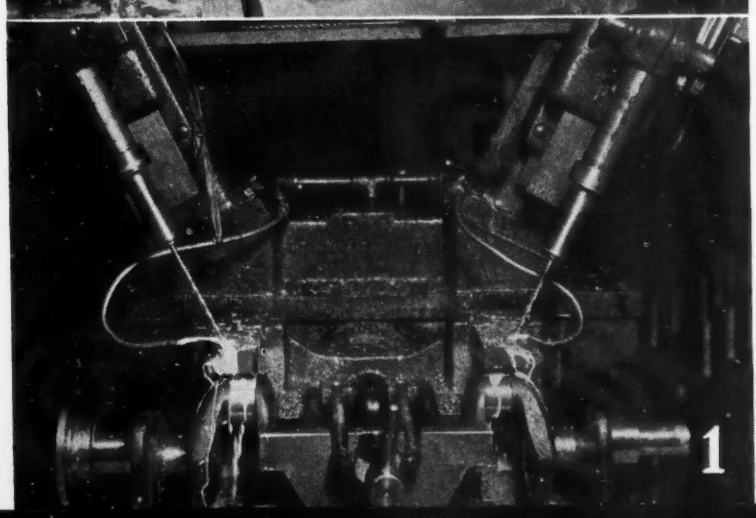
DESCRIPTION	MATERIAL		OPERATION	EQUIPMENT	BROACH DATA (H.S.S.)					
	Descrip.	Brinell			Length (in.)	Stroke (in.)	Cutting Speed, F.P.M.	Matl. Removed, cu. in.	Ave. Pcs. Per Grind	Prod. Per Hour
Cylinder Block	Cast Iron	170-207	Four Bearing Cap Surfaces	Cincinnati Hyd. Horizontal	40	69	25	1.71	7,000	112
Nos. 1-2-3-4 Crankshaft Bear. Caps	Cast Iron	187	Joint Face & Ends	Foote Burt No. 2 Duplex	41	50	35	0.62 per cap	30,000	102 sets
No. 4 Bearing Cap	Cast Iron	187	Step for Gasket	American Horning Hyd. V-2, 12-ton	12	17¼	18	0.221 (two caps)	35,000	772
Connecting Rod Cap	Drop Forging	228-255	Bearing Face	Oilgear 12-ton Sideplate Broach	15⅝	20	20	0.0856 (ea. face)	11,000	600
Connecting Rod Cap	Drop Forging	228-255	Boss Sides & Face	No. 6 42" Cincinnati Double Ram Vert. Hyd.	28	42	22	0.0975 (ea. side)		
Connecting Rod Cap	Drop Forging	228-255	Joint Face & Radius	70 in. Foote Burt Contin. Horiz.	74⅜	..	62	0.295	11,000	720
Connecting Rod Cap	Drop Forging	228-255	Boss Sides & Face	60 in. Foote Burt Contin. Horiz.	39⅜	..	24.5	0.070	22,000	800
Connecting Rod	Drop Forging	228-255	Joint Face & Radius	70 in. Foote Burt Contin. Horiz.	74⅜	..	62	0.394	11,000	720
Brake & Clutch Pedal	Drop Forging	143-187	Pad Contact Face	No. 22 Foote Burt Vert. Hyd.	39	36	25	0.17	10,000	145 (ea. pedal)
Engine Rear Support Brackets	Mall. Iron		Pads	Cincinnati 5-42 Duplex Vert.	24	42	35	0.328 R.H. ram 0.203 L.H. ram	1,200	131 (pos.)
Engine Rear Support Brackets	Mall. Iron		Two Angular Faces	V-34 Amer. Dble. Ram Hyd.	24	34	35	0.328	12,000	131 (pos.)
Water Pump Body	Cast Iron	187	Elbow Pad	V-2, 6-ton Amer. Horning Hyd.	20¼	24	13¼	0.56	11,000	240
Rear Axle Housing	H. R. Steel		Flats & Bevels on Flanges	V-34 American Duplex	30 6	40	22	0.092	22,000	170











small self-contained department recently placed in operation. As you will note in Table 4, giving the sequence of major operations, the equipment is of the latest type and designed specifically for high productivity with finest precision. Although the entire facilities of this department are housed within a floor space of only 5630 sq. ft., they can turn out 18,500 pistons in a day's run of three shifts.

One of the most interesting items of equipment in this de-

1—Drilling oil holes in No. 2 and No. 5 pins on one of a battery of Leland-Gifford special unit cycle drilling machines.

2—Greenlee's two-way drilling machine, drilling, boring and counterboring on both ends of the crankshaft.

3—Finish grinding all pins. Battery of 16x42 Landis hydraulic grinders, 17x40 double-end Norton crankpin grinder, and 10x36 Norton grinders.

4—All shafts checked for static and dynamic balance. This view shows balancing on a No. 2 Tinius Olsen machine.

5—Norton double wheel grinder rough grinding No. 2 and 3 main bearing diameter and width.

6—Finishing operations oil slinger and flywheel end of crankshaft on 17x6 Le Blond lathe.

7—Mill locating pads—two shafts at a time—on double-end Cincinnati mill.

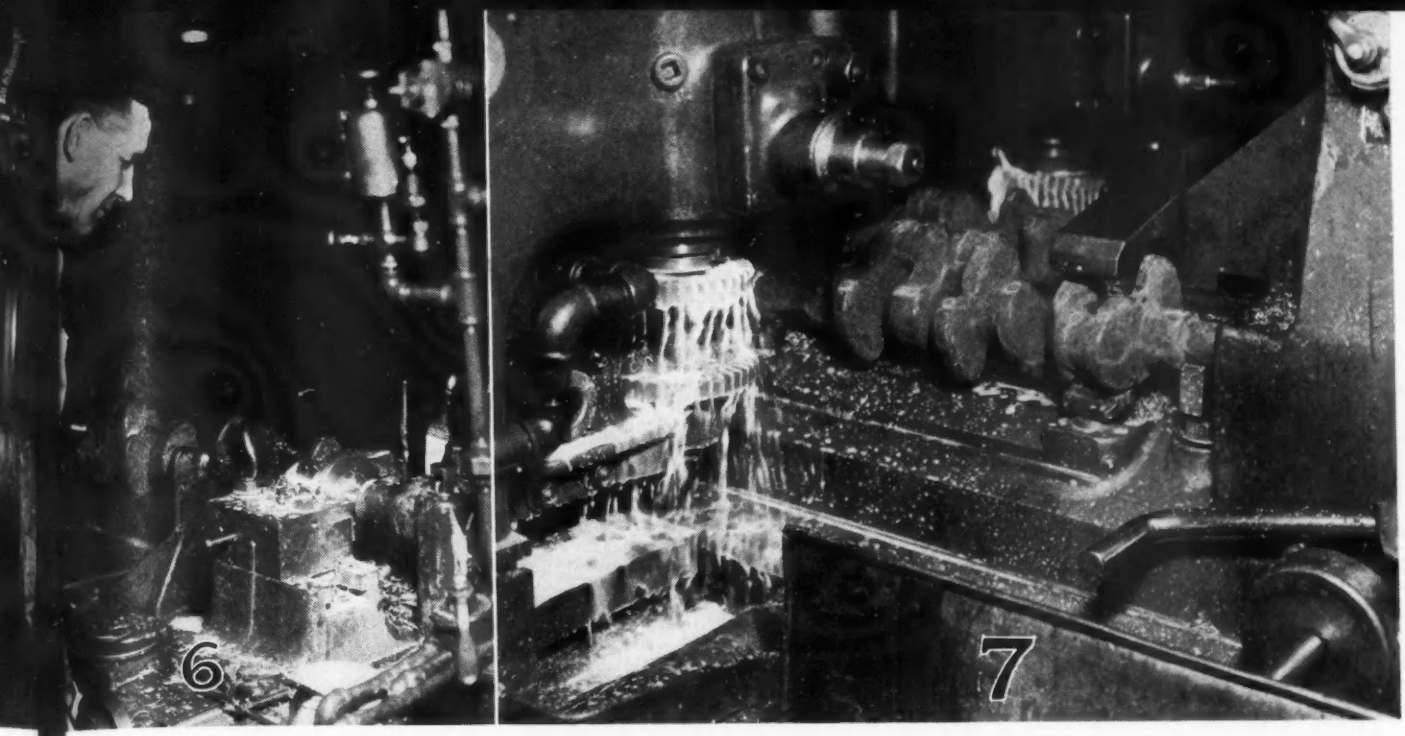
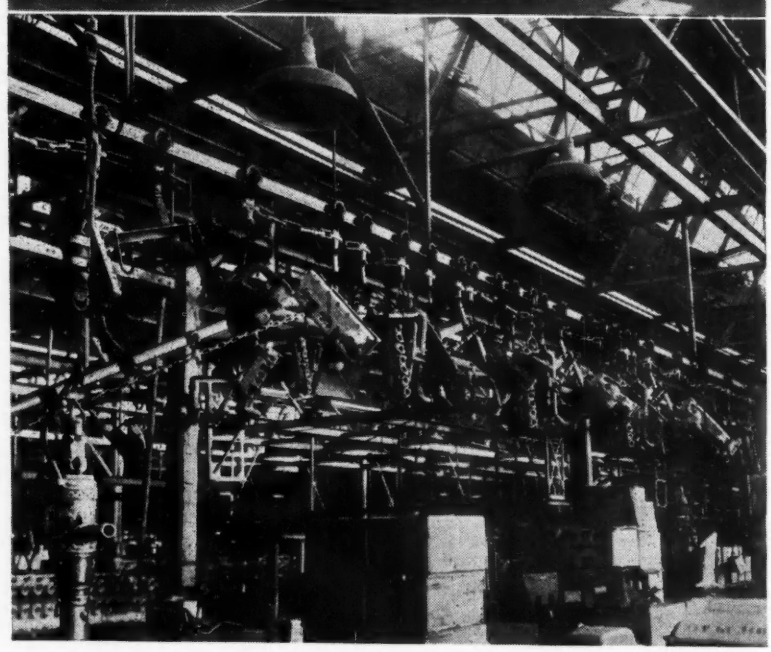
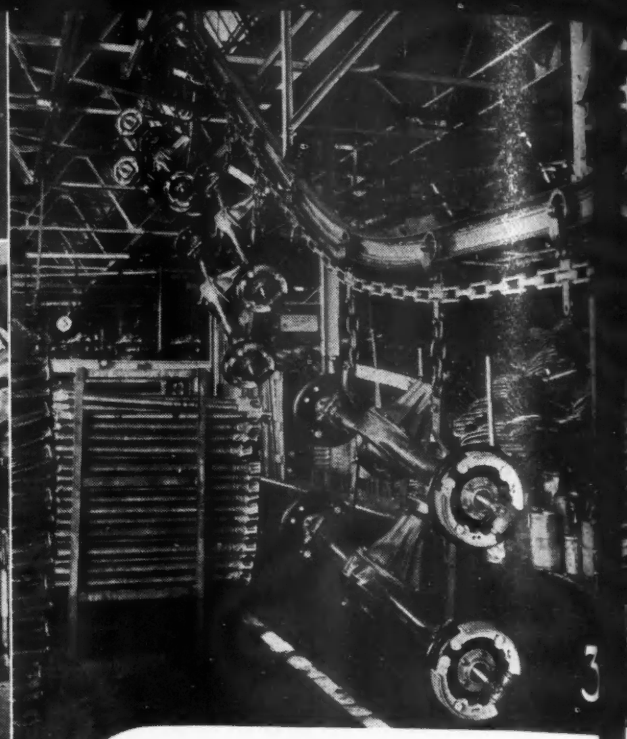


Table 6—Sequence of Operations on Plymouth Crankshaft

Operation	Equipment
Check C'weight Clearance	Bench
Mill locating pads (2 cranks at a time)	Double End Cinn. Mill
Rough Form Bearings and Form Flange	No. 5-ACL Le Blond Auto Crank Lathe
Clean out center in flange end	No. 2B Edlund Drill Press
Straighten	20-ton Genl. Flex. Press
Rough grind No. 2 & 3 Main Bearing dia. and width	14x50 Norton Double Wheel Grinder No. 541 14x36 Norton Double Wheel Grinder B-5302
Rough grind OD & shoulder of front main bearing	14x50 Norton Grinder
Rough grind gear fit.	14x50 Norton Grinder
Rough grind side walls of rear main bearing	10x50 Norton Grinder
Rough grind OD of rear main bearing	10x50 Norton Grinder 10x50 Norton Grinder 10x36 Norton Grinder
Machine front & rear ends	Greenlee 2-way Drilling Machine
1st station load (2) cranks 2nd station front end drill 1" hole 1 3/16 deep Rear end Drill 27/64 hole 1-3/16 deep 3rd station front end Drill 25/32 hole 1-15/16 deep Rear end—drill 27/32 hole 2-7/16 deep 4th station front end bore—C'bore chamfer & face end 6th station front end tap 1-1/8-14 hole Rear end—ream pilot hole to .927 .930 dia. 4th station rear end undercut flange 5th station front end center Rear end, center	
Finish form oil slinger groove, turn OD of flange	16x8 Le Blond Heavy Duty Auto Lathe
Finish face back of flange and turn bolt circle. Finish face flywheel face of flange, chamfer OD of flange and turn OD of oil slinger	17 x 6 LeBlond lathe
Turn C'weight sides for checking	No. 6-AC-LeBlond 2 spdls Auto Crank Lathe Bench
Gage Pins for Clearance	5-AC LeBlond Pin Lathe
Fillet, Form & Finish Check all pins	20-ton General Flex. Press
Straighten	No. 2-14" Leland & Gifford Spec. 2-spdl. Angular Drill Press with Hyd. attach.
Drill Oil Holes in No. 3 and No. 4 Pins	(1) Leland & Gifford Spec. Unit Cycle Drilling Mach.
Drill Oil Holes in No. 2 & 5 pins	No. 2 14" Leland & Gifford Spec. 2-spdl. Angular Dr. Pr. with Hyd. attach.
Drill Oil Holes in No. 2 & No. 5 pins	No. 2 14" Leland & Gifford Spec. 2-spdl. Angular Dr. Pr. with Hyd. attach.
Drill Oil Holes in No. 1 & No. 6 pins	Hydraulic Pressure Units to feed hyd. drill presses 16x42 Landis Hyd. Gr. DM-265 17x40 Double Head Norton Crankpin Gr. 10x36 Norton Type B-81 Grinders
Finish Grind all pins	

Operation	Equipment
Straighten	20-ton Flex. Press
Re-center both ends	13x6 LeBlond Lathe 18x6 Monarch Lathe
Finish grind OD & width of No. 2 & 3 Main Brgs.	Norton 14-BA Grinder 10x36 Norton Type B-81 Grinder 14x30 Norton Grinder
Finish grind OD & shoulder of front main brg.	10x36 Norton Grinder 14x50 Norton Grinder 10x50 Norton Grinder
Finish grind gear fit OD & shoulder	
Finish grind side walls of rear main brg. to width	10x36 Norton Grinder 10x50 Norton Grinder
Finish grind OD of rear main bearing	10x36 Norton Grinder
Finish grind OD of oil slinger	10x36 Landis Grinder
Straighten	20-ton Flexible Press
Mill Keyway for Pulley	18" Cinn. Mfg. Mill
Mill Letter "A" Keyway	18" Cinn. Mfg. Mill
Finish Grind Pulley Dia.	10x50 Norton Grinder
Finish Grind OD of Flange	10x36 Norton Grinder
Drill & Ream (4) .4395 .4405 Holes in flange	15 1/2 D Foote Burt Drill Press
Rough grind checks to balance when necessary	Bowser Bal. stand, 24" Diamond Motor driven floor type grinding machine
Drill for semi-finish balance	24" Cinn. Drill Press No. 3 Avey Drill Press CM-4296 24" Cinn. Drill Press
Dynamic Balance	Olsen Lundgren New Type balancing mach. No. 2-S Tinius Olsen Bal. machine P-1586 Olsen Lundgren Elec. Spark Semi-Auto Horiz. Cradle Type Static Dynamic Bal. Machine style "S"
Drill for balance	24" Cinn. Drill Press No. 3 Avey Drill Press
Straighten	20 ton General Flex. Power Press
Finish bore pilot hole	Chard Lathe 14x7 LeBlond Lathe
Grind Face of flange	10x15 Norton Grinder
Check balance	No. 2 Tinius Olsen, Crankshaft bal. Check, Machine Olsen Lundgren Crankshaft Bal. Check. machine
Grind checks to balance when necessary	Diamond Floor type grinder
Drill for finish balance	No. 121 Baker Drill Press 24" Cinn. Drill Press No. 3 Avey Drill Press
Inspect	Bench
File burrs & peen oil holes	Bench
Polish oil slinger	No. 211 Greenfield 12x5 speed lathe Blount Speed Lathe
Lap pin & Main Brgs. & walls of Brgs.	Schraner Crankshaft Lapping Machine
Wash	KleenEZ washer
Inspect	





1—Motor parts delivery stretches 1128 ft. in length in picking up the stuff that feeds the engine assembly line. It hurries along at 61.5 ft. per min.

2—Hood storage is really a noble stretch covering a developed length of 2043 ft. It moves at 35 ft. per minute.

3—Axle delivery line is 968 ft. in length and travels at 41 ft. per min.

4—Here is an uncommon sight. Chassis frames, bulky as they are, start on the monorail at the loading dock and wind through the plant until picked up at the frame assembly station. This line is 1439 ft. developed length.

partment is the exact weight machine made by Snyder. This machines every piston to a common weight and actually makes it unnecessary to consider weight as an element in matching sets of connecting rod assemblies.

Another distinctive item of equipment adopted recently is the new Gisholt lathe for turning and facing flywheels. As described in AUTOMOTIVE INDUSTRIES, Feb. 8, a battery of two of these heavy duty machines takes the place of six machines of an earlier type made by the same company. Three batteries of these machines will handle the entire output of flywheels and will release much valuable floor space now occupied by the older equipment.

Because Plymouth pioneered surface broaching in mass production, it is extremely interesting to follow their development of this new art of metal cutting. Today they have about ten different parts that are finished by broaching, including several novel applications. The chief details of most of these jobs are given in Table 5. Complete details of some of the major setups are given in the pictorial section on surface broaching.

For 1936 production Plymouth adopted synthetic enamel finish for all sheet metal parts as well as the body, following a successful period of experimental production last year. This resulted in some striking changes which are not at all evident on the surface but are brought out here

3 4

Plymouth Factory Executive Personnel

P. C. SAUERBREY	Vice-Pres. in Charge of Mfg.
E. S. CHAPMAN	Gen. Works Mgr.
A. H. PATERSON	Factory Manager
E. J. HUNT	Master Mechanic
C. C. WILLIAMS	Plant Engineer
O. M. CHASE	General Supt.
F. A. SWAYZE	Planning Supt.
G. C. VOORHEES	Burden Control
L. H. SLADE	Timestudy Supt.
A. E. JONES	Chief Inspector

to show the mental flexibility of this organization. You will recall that just about a year ago we published in AUTOMOTIVE INDUSTRIES a rather comprehensive article describing Plymouth's then new paint department featuring among other things a hitherto unexplored field of reclaiming paint overspray. During the time that this reclamation scheme was in operation they managed to save about $300 per day on what was a waste product heretofore. And this paid for the salvaging set-up many times over. It happens that when synthetic enamel was adopted the entire salvaging set-up had to be abandoned over night because the technique was not adaptable to synthetic enamel residue. So they scrapped the whole thing. There was no economic loss because the installation had paid for itself but the experience with the salvaging of lacquer will be applied to the problem of handling synthetic enamel base materials and it would not surprise us at all to learn very soon that Plymouth's versatile plant engineer, C. C. Williams, had developed a way of reclaiming the synthetic overspray.

Of course one of the big problems incident to the adoption of synthetic enamel finish is the need for baking oven equipment and that probably has been one of the chief drawbacks to its wider spread through the industry. Since Plymouth does not build or finish the bodies, their problem was somewhat more simple and its solution involved only the installation of additional overhead baking ovens for the sheet metal parts.

This worked out in interesting fashion in the case of head lamp and tail lamp finish. It is probably well known that Chrysler Corporation has spent considerable energy in the development of induction heating equipment and pioneered its application to mass production. Several installations have been in use at Plymouth for quite a while but the lamp job is easily the most ingenious.

Plymouth buys head and tail lamps completely assembled and with the exterior metal finished in a ground coat. These assemblies come packed in cartons, are unpacked, hooked on the conveyor, and then routed to the spray booth according to color specifications. For baking the synthetic finish they use an induction-heated oven which does the job quickly and without affecting the lamp assembly in any way, since only the metal parts are heated up.

The final development of the lamp job, now pending in the plant engineer's department, is the installation of an unloading station for lamps right at the loading dock. The lamps will be taken out of the cartons and hooked on a special conveyor line running from the incoming platform right to the interior of the plant where the lamp department is now located. Their objective is not only to release valuable floor space now taken up by stocks of cartons but also to facilitate the development of a new carton salvage process. Thus all carton shipments would be received at a central station outside the plant proper, the cartons would be unloaded, knocked down, baled, and returned to the purveyor at a handsome saving.

Another new wrinkle here is introduction of a slat conveyor to facilitate the final assembly of the radiator and radiator shell. This is probably the first example of handling the subassembly operation in this fashion.

Considering the number of "firsts" mentioned in just this brief outline, one can get a better appreciation of the progressiveness of this organization. If you must be convinced that modernization in thinking and equipment and process really pays go to Plymouth for the best living answer.

The Horizons of Business

by Joseph Stagg Lawrence

A Fake Attack on Lobbyists

WILLIAM JAMES, the noted psychologist, held that habits could be regulated by controlling the circumstances which nurtured them. Although it is will power which enables the individual to acquire good habits and avoid bad ones he urged the desirability of surrounding the will with circumstances which promote the accomplishment of the object. Thus the man who suffers a chronic thirst should shun swinging doors.

It seems that Congress in a righteous mood has taken this principle very much to heart. Washington has suffered from a plague of lobbyists. These creatures visit the capitol for the purpose of thwarting the exalted intentions of Congress and corrupting the pure minds of the legislators.

Hark to the indignant John J. O'Conner, Democrat, of New York, chairman of the House Rules Committee:

"I've never seen a lobbyist affect the result of a vote but they are a nuisance to the members. If this bill has no more effect than to keep these leeches off us, and clear our corridors, it will be a valuable measure. Why, when the Holding Company Bill was up last year, you could hardly get into the chamber, there were such swarms of lobbyists at every door." Thus Mr. O'Conner, while not admitting that persistent lobbyists could deflect for one moment the high purposes of a Congressman, denounces them as a minor evil, a nuisance which must be abated.

A Return to First Principles

Every good citizen will sympathize with the indignant Mr. O'Conner. The law which he mentions, whose passage seems assured, looks like a return to wholesome first principles of constitutional government. The founding fathers taxed their ingenuity to insure the full freedom of the legislative process. They denied the citizens of Washington the franchise for fear that it might be exercised to the detriment of the national welfare in favor of special measures serving the narrow interests of the capital city. For a somewhat similar reason members of the armed forces were denied the right to vote during the period of their service. Again there was the possibility that a narrow interest urged with peculiar force might conflict with the national interest. Any coercion, starting with the vote cast by the citizen, and including the deliberations of Congress, the impartial administration of the laws and their just interpretation was abhorrent to the framers of the constitution. They went as far as their intelligence and the limitations of a solemn covenant would permit in protecting Congress, the executive and the courts from each other and from outside interests.

Danger to Democratic Institutions

The passage of the bonus, the power of organized labor, the success of the farmers in securing adoption as wards of the Treasury, the disgraceful subsidization of silver producers, the rise of the Townsendites are all ominous reminders of the jeopardy in which democratic institutions stand. This bill, aimed at lobbyists, seems to deserve the support of every honest citizen.

A more careful examination of the measure is disappointing for it stands out not as a forthright defense of first principles but rather a sham bulwark of decent government with perhaps a more sinister aspect.

The bill was passed by the House on March 27 without a record vote. The action is explained by a stratagem of Senator Hugo Black. The gentleman from Alabama discovered that six representatives had accepted the summer hospitality of one Robert E. Smith, an alleged public utilities lobbyist from the Northwest. Senator Black made the names of these representatives public and the House apparently felt that this placed it in a position where it could not afford to deliberate.

Provisions

The bill makes it necessary to place upon the public records in the office of the House Clerk the name, financial backing, and purpose of organizations or persons employed principally to influence legislation in Congress. More specifically the lobbyists must account for every sum of money spent over $10 and must account for every penny received. These reports must be made every three months and must be cumulative so that any interested person in looking at the record can tell exactly how much has been collected and spent over a period of time. Every individual who qualifies as a lobbyist must be registered, must state the names of the persons from whom they are receiving money and explain why they are in Washington.

It is quite apparent that the detailed regulations are designed to discourage representation of interested organizations in Washington. In addition to the burden of compliance, there is a penalty of $1,000 or a year's imprisonment or both for any violation. It is the belief of the framers of this bill that its provisions will include the counsel and officers of large corporations who come to Washington, even though they may be there for only a short period of time each year. Apparently the bill will embrace thousands of individuals, societies and organizations. In fact, every group which at any time feels a vital interest at stake in Washington and has sufficient temerity to enter a defense comes under the provisions of this legislation.

The Colored Gentleman

It is obvious that such a law, if it proceeds from a sincere solicitude for the independence of the legislature and does not go to extremes, has much to commend it. Citizens on the side lines have noted with rising alarm the extent to which Congressmen have been forced to bow to interested pressure coming from all sides. The fault of this measure is not in its purported purpose but rather in the manner in which that purpose is pursued and the significant omissions. During the past three years Congress has been satirized and the Government severely criticized because the legislative body has frequently been asked to pass legislation of vital

(Turn to page 518, please)

JUST AMONG OURSELVES

Where Else But In America?

THE text for this week is the twenty-seventh annual report of the General Motors Corp., released for publication last Monday. We have dealt elsewhere in this issue with the operating and financial aspects of the report, reserving for consideration here some things which the Corporation has cited in its topical outline of the report as "a discussion of the importance of transportation, together with comments on government regulation and taxation."

Pointing out that the ascertainable direct tax bill of the Corporation amounted to $63,150,000 in 1935 and that this amounted to $334 per employee and to 21 per cent of the total payroll disbursed by the Corporation within the United States, the report says ". . . anything that tends to increase the cost of doing business lowers the productivity of industry in its important role of creating wealth. The cost of government is no exception to the rule.

"The reason is," the report goes on, "that as costs are increased, everything else being the same, selling prices must increase, so that less goods can be consumed and hence less can be produced."

The Future of U.S. And Our Business

ON the question of what is likely to be the future trend of the relationship between government and business, the report (which is signed by Lammot duPont and Alfred P. Sloan, Jr.) says flatly "the Corporation believes, and has no hesitancy in taking the position, that the present attitude of the Government and the results of its experiments in the realm of economics have not, to say the least, resulted in accelerating the process of recovery or inspiring confidence in the operations of the future. On the contrary, they have definitely postponed recovery. It is reasonable to believe, however, that sooner or later such unsound policies as exist will discredit themselves and hence will be eliminated."

In addition to the above matters, which are presumably of interest to every business man, the report, in discussing operations, reinforces further the Corporation's belief in the competitive system.

The Corporation "cannot believe," says the report, "that Government bureaucracy involving, as it necessarily must, the political consideration, is any adequate substitute for individual effort and initiative. Measured by the luxuries and conveniences which are provided by industry for the American people, at prices within the reach of the masses—something not enjoyed by the people of any other nation in the world—the record of American industry demonstrates the fact."

And again, in discussing the importance of transportation and the results of Government attempts at its regulation, the report concludes "instead of the deadening hand of strait-jacket governmental regulation, would it not be wiser to establish each agency (of transportation) on its own foundation of fact and effectiveness and permit each to develop its maximum contribution to the national welfare? This would restore the principle of free enterprise and encourage the exercise of individual initiative. This is the real road to progress."

Five Years Ago And the Present

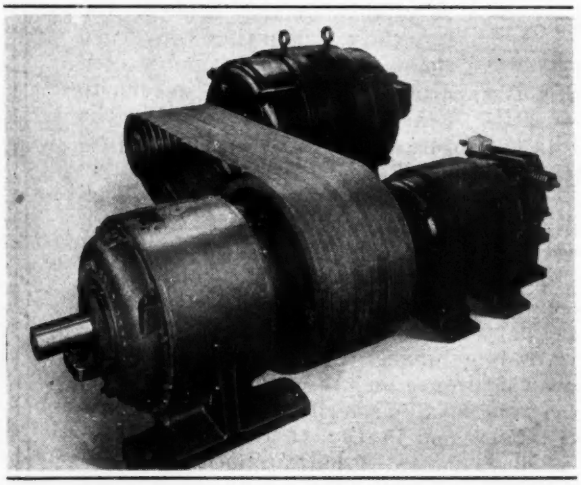
FIVE years ago, the annual reports of the General Motors Corp., when they concerned themselves with economic conditions, limited this concern to general questions affecting the future course of profit and production. It is a remarkable commentary on conditions faced by industry today, that in each department of a report of 57 pages, a great corporation should find it necessary to return again and again to the influence of government interference on the course of business.

Such need has become apparent in the current annual reports of many another American corporation, both within and without the automotive industry. Few have stated so calmly, so succinctly, so broadly, the issues involved. Among other things, the G. M. report undertakes the important job of defining the responsibility of American business in presenting the issue to its stockholders and public.

Says the report, "No one can deny that, as our national economy becomes more and more involved, the margin of error within which, as a nation, we can operate and maintain the essential economic balance, to say nothing of making progress, is being constantly narrowed. If our country is to remain a democracy, in fact, it is essential that, throughout the process of education, there be developed a better understanding not only of the factors involved in our increasingly complicated national economy, but also of the economic consequences of the things that are done, as well as the things which are not done, which influence the lives, the happiness and the security of all the people."

So we give you, gentlemen, the 1935 report of the General Motors Corp., as an important contribution to American economics. —H. H.

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools



Universal variable speed drive

Two Motors For Variable Speed Drive

The Universal Gear Corp., Indianapolis, Ind., has developed a variable speed drive employing two electric motors. The speed reduction unit is of the planetary type, the smaller motor being connected in the conventional manner, directly to the pinion gear, while the large motor drives the ring gear of the planetary through V belts and the quill input shaft. Various combinations of the two motors give the desired speed changes. For example, both motors can drive in the same direction, the large motor can drive alone, the small motor can drive alone, or the large motor can drive in the normal direction while the small motor drives in the reverse direction.

These 4-speed units, which are used in some of the large automotive factories, can be furnished in any required capacity.

New Thor Products

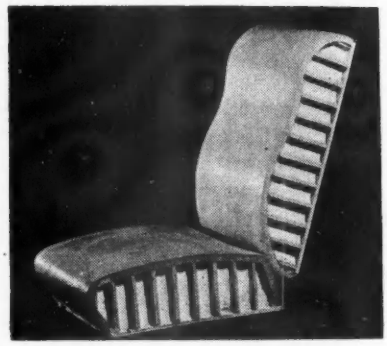
The Independent Pneumatic Tool Co., Chicago, Ill., announces a new portable electric sander and a new polisher. The Thor sander is designed for sanding, cleaning and preparing automobile bodies for paint. This tool has a free speed of 3100 r.p.m. Features claimed for the electric polisher are its light weight, balance and ease of handling. Both the armature and the spindle run in ball bearings to give maximum torque to the wheel. The tool weighs 7¾ lbs. and has a free speed of 1950 r.p.m. Both the sander and polisher are designed for easy inspection and cleaning.

Steel Plates Protect Concrete

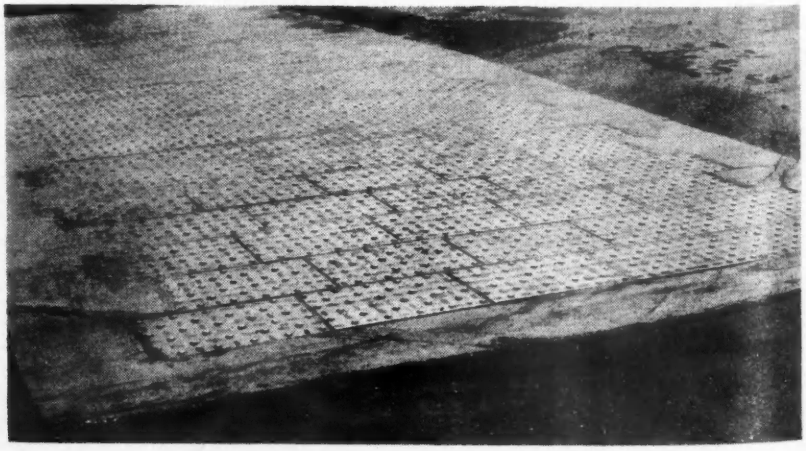
The Bethlehem Steel Co., Bethlehem, Pa., has just placed on the market a new type of protective surfacing for concrete floors, consisting of ⅛ in. rolled steel plates, which are furnished in two types, one for roadways, and the other for plant floors, loading platforms, etc. Both types are identical, except that the one for roadways is equipped with button-head studs to prevent skidding. Side by side, and end to end, these plates are placed on the surface of the concrete as pouring proceeds, forming a continuous surface of steel securely anchored in place. The standard size of these plates is 12 in. by 18 in. with 1½ in. sides. The paving plates illustrated have been in service for more than a year, and although traffic is heavy, no perceptible wear is said to have occurred.

Seat Cushions of Rubber

Mishawaka seat cushions are made from liquid latex, molded to the exact size and shape desired. They are made up of thousands of tiny intercommunicating rubber cells that are said to give them a shock-absorbing action, and being completely porous, the flow of air keeps the cushions cool. Other advantages claimed include lack of maintenance expense because they do not sag or break down. Padding and stuffing are eliminated.



Latex Seat Cushion



Bethlehem steel floor plates

Developed by the Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., these cushions have been tried out in a number of railroad and bus lines, and in the trucking and automotive field.

Johansson Gage Blocks

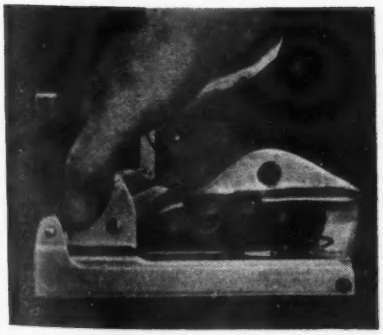
A new combination of Johansson gage blocks and accessories, including 35 blocks, two holders and two jaws, is now offered by the Johansson gage division of the Ford Motor Company. The new set is known as the No. 2 gaging system set and replaces the earlier No. 2 set which contained only one holder with a maximum size of 4.125 inches. A larger holder, having a maximum opening of 8.875 inches, as well as the smaller holder, is now included in the set.

The 35 blocks in the set will make 80,000 different size gages in steps of .0001 inch, from a minimum size of .300 inch to more than 8 inches. The set includes nine blocks in the one ten-thousandths series; nine blocks in the one thousand series; nine blocks in the ten thousand series; five blocks in the one hundred thousand series; and three blocks in the inch series. The jaws are one-quarter inch.

The adjustable holders and jaws provide for both internal and external measuring. The sets are available in three qualities, designated as the working set, inspection set, and laboratory set.

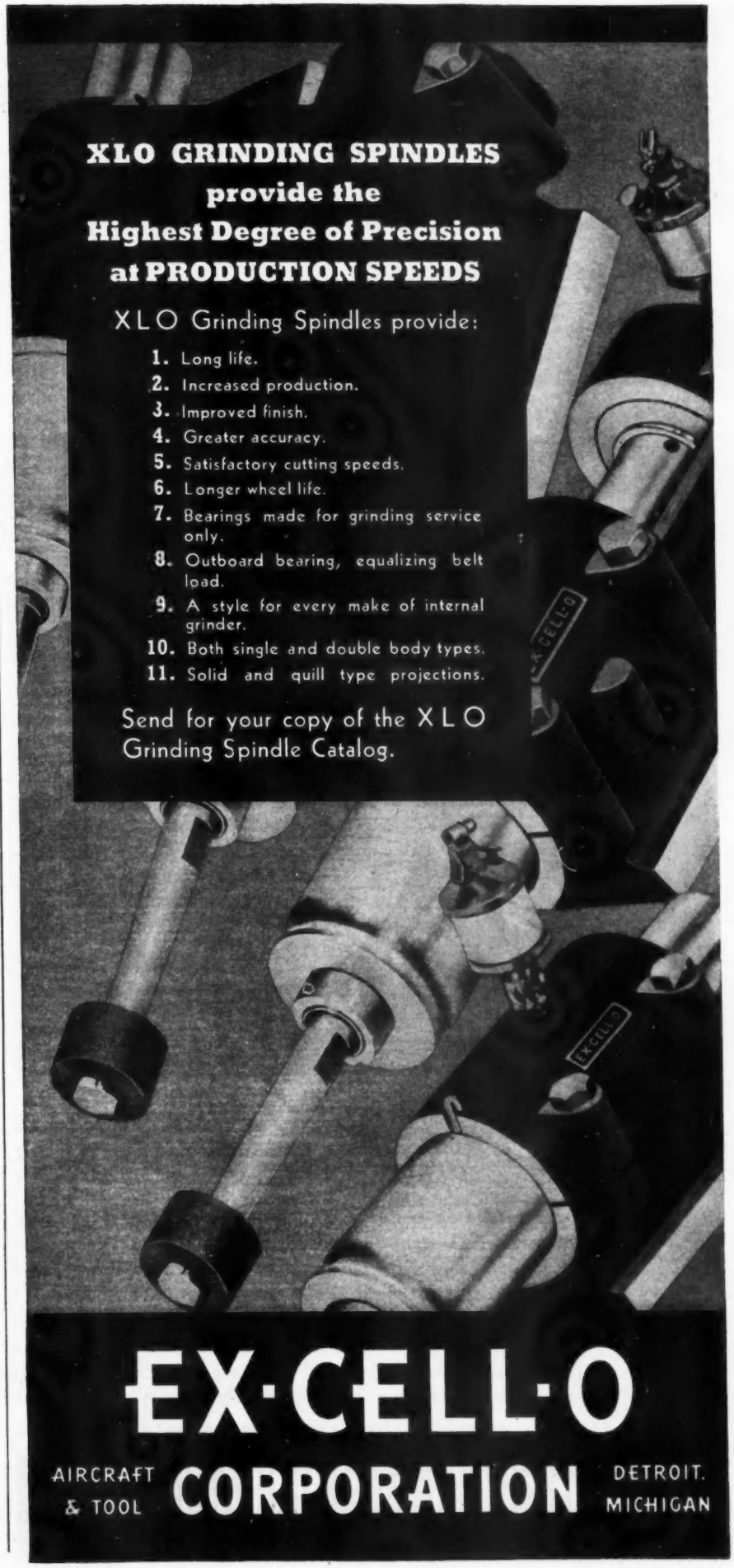
Hansen Offers One-Hand Tacker

Announcement is made by the A. L. Hansen Mfg. Co., Chicago of a new device known as the Kling-Tite automatic one-hand tacker, designed for various tacking jobs such as fastening insulation on the frame work of refrigerator bodies, tacking covering materials on tops, floors and seats, and doing miscellaneous tacking jobs. The



Kling-Tite Tacker

operating principle of this tacker is said to be very simple. By squeezing the handle, the hammer is pressed against a spring, lifted a short dis-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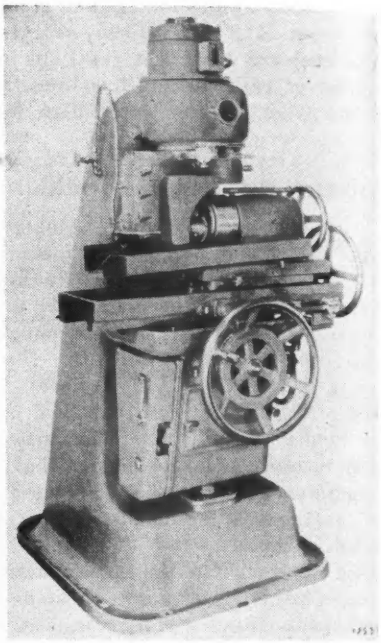
tance and tripped, giving a trip-hammer action. A strip of 84 tackpoints is loaded into the channel of the machine, and with each gripping of the handle a single tackpoint from this strip is fed into the throat of the machine and driven by the impact of the hammer into the object being tacked. Tacks of different length up to a half inch may be used.

Automatic Gear Finisher

To meet the demand for quieter and more accurate internal gears, the National Broach & Machine Co. of Detroit has developed the Gear Finisher illustrated. Where internal gears are in continuous mesh and run at high speeds, it is important that the bearing on the teeth should have a crowned surface, and to meet this requirement, this new machine can be adjusted to crown the face of the teeth to any desired amount. The production rate is approximately 30 gears per hour, and the finish from the tool is said to be so smooth that no additional operations of burnishing are required. Operation is automatic.



Automatic Gear Finisher

DERMA-SAN

DISINFECTANT

Prevent Oil Dermatitis with **DERMA-SAN!**

YOUR MEN do better work when you sterilize cutting lubricants with Derma-San. For Derma-San keeps oil dermatitis out of your plant. By protecting your workers against this serious skin disease, it saves compensation and medical costs. By eliminating oil infections, it increases efficiency and production. Guard your men with Derma-San. Add 1 pint of Derma-San to 35 gallons of cutting lubricant, and kill pus-forming germs before they attack your workers.

'Derma-San is ideal for all general plant sanitation.

The HUNTINGTON LABORATORIES Inc.

DENVER HUNTINGTON, INDIANA TORONTO

The Horizons of Business

(Continued from page 514)

importance without giving it the deliberation and extended study required.

Any measure which would restore the independence of the legislative body would seem to be a sound step. The bill in question specifically exempts the pressure exercised by the Administration. Representatives Culkin and Reed of New York offered an amendment which would prohobit any public official from using the power of patronage for the purpose of influencing legislation. This amendment was defeated by a vote of two to one. It would seem, therefore, that the bill's aim is more at lobbyists working against a program of a government than at lobbyists. In other words, pressure *per se* is not objectionable. If exercised for the right cause it is anointed and blessed. After experiencing this shock the student who examines the bill finds that it also exempts farmers, veterans, and labor. One may well ask what the phrase "equal protection of the law" means.

Canadian Dealers' Gross Profit Estimated at 20%

In a special survey conducted by the Dominion Bureau of Statistics, Ottawa, Ont., for the first time this year, it is shown that the average gross margin percentage of net sales affecting retailers of automobile supplies, etc., in Canada, is as follows: automobile dealers, 19.9 per cent; automobile accessories, 31.8 per cent; and filling stations, 20.4 per cent.